Department of consumer and corporate affairs

hearing aids

Consumer Research Report No. 1

Department of consumer and corporate affairs

INTERDEPARTMENTAL COMMITTEE ON CONSUMER AFFAIRS

SUBCOMMITTEE ON HEARING AIDS

REPORT ON HEARING AIDS

OTTAWA, JANUARY 1970

CONSUMER RESEARCH REPORT NO.1

TABLE OF CONTENTS

1. INTRODUCTION

Over a period of many years the Federal Government has received complaints from the public about hearing aids, generally, that they were too expensive and their performance was unsatisfactory. Some of the complaints were referred to the Director of Investigation and Research under the Combines Investigation Act. Although the Director had a number of informal inquiries made they did not reveal evidence of offences under the Act. Complaints were also received by the Department of National Health and Welfare but it was not clear that hearing aids were covered by the provisions of the Food and Drugs Act relating to devices. The definition of device in that Act was amended on August 18, 1969 to include hearing aids. (See Appendix I). Provincial governments have received complaints also and at least one salesman has been prosecuted and found guilty of fraud for failing to deliver hearing aids which had been paid for.

Following the introduction of a bill to create the Department of Consumer and Corporate Affairs in the fall of 1967, an Interdepartmental Committee on Consumer Affairs was established.

A proposal was made to this Committee that an inquiry should be made into all aspects of hearing aids. As a result, the Committee agreed on November 15, 1967 to the establishment of a technical subcommittee and directed the subcommittee to solicit information from organizations and individuals with special knowledge of hearing aids.

Members of the Subcommittee on Hearing Aids were as follows:

Chairman:	Mr. W.A. Delbridge	Department of Industry, Trade and Commerce
Members:	Dr. O. Hoffman	Department of National Health and Welfare
	Dr. P.E. Ireland	Adviser to the Department of Veterans Affairs
	Mr. R.I. Milner	Department of Consumer and Corporate Affairs
	Dr. G.L. Thiessen	National Research Council
	Miss C.E. Wishart	Department of Consumer and Corporate Affairs
Observers:	Dr. W.J.F. Young	Department of Veterans Affairs
	Mr. D.L. Hillock	Department of Veterans Affairs

Miss Wishart also acted as Secretary to the Subcommittee.

The Subcommittee invited briefs from twenty-five organizations and individuals who were considered to have a special knowledge of the industry, the problem of deafness, the treatment of deafness, particularly by use of hearing aids, and the problems of consumers with respect to hearing aids. Many of the organizations and individuals indicated an interest but only thirteen briefs were received. (See Appendix II).

This report is a summary of the information obtained through the inquiry and a statement of the Subcommittee's recommendations.

2. THE NATURE OF COMPLAINTS ABOUT HEARING AIDS

Complaints made by hearing aid purchasers which were drawn to the attention of the Subcommittee told of experiences

they had with dealers and salesmen. These complaints were largely about the high prices of hearing aids and the high costs of upkeep including the cost of batteries and the lack of repair parts. Complaints that hearing aids were not satisfactory and that refunds could not be obtained for such aids were frequent also. Other complaints were about high pressure salesmen, misrepresentations as to the effectiveness of the aid, misrepresentations about the salesman's qualifications to fit hearing aids, misrepresentations about the terms on which a trial was granted, misleading advertising, failure to deliver the hearing aid purchased, failure to provide the guarantee card for the customer to fill in and return to the manufacturer, sale as new of hearing aids which had been out on trial to other customers and inadequate or misleading diagnosis of the nature and extent of the hearing loss.

Individuals and organizations interested in helping people who are hard-of-hearing submitted observations about general faults they perceived in the industry. They were critical of the high prices of hearing aids and of their repair. They criticized the varying acoustic results given by different samples of the same model of hearing aid. They stated that hearing aid advertisements play on the emotions and vanity of the hard-of-hearing without presenting much factual information for guidance in the purchase of an aid.

They pointed out that some of the problems experienced by hearing aid users could have been avoided if the users had had certain information. Specifically, many prospective customers did not have an adequate diagnosis of their hearing loss and were unable to assess correctly what a hearing aid could do to assist them. Problems also arose when there was a lack of adequate training in how to use the hearing aid to its full potential.

Two surveys have been made in Canada to examine, among other things, consumer satisfaction. Neither survey was very large. The British Columbia Department of Trade and Commerce survey revealed that 80 per cent of the customers surveyed were satisfied with the service they received, but only 66 per cent were satisfied with their hearing aids. The Consumers' Association of Canada survey found that 60 per cent of the people reporting considered their hearing aids to be correctly fitted. Seventy-one per cent of the people responding to this survey had consulted medical ear specialists.

3. THE PROBLEMS OF THE HARD OF HEARING

People who are hard-of-hearing often suffer from a feeling of isolation. The most obvious reason for this is that they are deprived to some degree of full and free participation in conversations and of the stimulation provided by television and radio programs, movies, concerts and theatre. Another important but less obvious handicap is that these people do not hear the background noises of everyday life which give the feeling of being part of the living world. This may give rise to intense loneliness. The sense of isolation can lead to a feeling of depression.

It has also been observed that many hard-of-hearing people will deny the existence of a hearing problem or, if they accept its existence, make efforts to conceal it. This may be a result of the attitude families and friends have towards people who are hard-of-hearing. Sometimes this is marked by impatience, manifested by shouting at a hard-of-hearing person with the attendant facial distortions which resemble anger. Sometimes it merely leads to a decrease in

conversation. The industry's own attitude towards hearing aids is ambivalent. It would be to the obvious advantage of manufacturers and dealers to sell more hearing aids and this could be achieved by making hearing aids as acceptable socially as eyeglasses. However, the emphasis in hearing aid advertisements is on miniature hearing aids which can be almost totally concealed. This confirms for the hard-of-hearing person the social need to conceal his handicap.

Recommendation

> That hearing aid manufacturers, distributors and retailers and associations interested in promoting the welfare of the hard-of-hearing initiate an advertising campaign to inform the public about hearing disabilities, prospects for treatment, limitations and capabilities of hearing aids and the ways in which friends and family can assist people with hearing losses.

4. THE PREVALENCE OF HEARING LOSS

Precise statistics in Canada on the prevalence of hearing losses are not available. One conservative estimate was that 2.5 per cent of the total population of Canada have a handicapping hearing loss. The prevalence of hearing losses increases significantly in the older age groups. A U.S. Department of Health, Education and Welfare study, "Characteristics of Persons with Impaired Hearing, United States - July 1962 - June 1963" showed that binaural hearing losses affected 22.3 persons per 1,000 in the total population, and the prevalence for the age group 65 years and over was 207.8. The number of deaf people in Canada will increase because of the steadily-

increasing population and the increasing number of older people. Increasing industrialization and urbanization with a concomitant exposure of the population to increases in noise levels will also increase the incidence of hearing losses. Improvements in the survival rate of newborn children with physical defects including hearing deficiencies have also added to the number of hard-of-hearing people.

It is recognized that the burden of hearing aid problems falls heavily on older people who, because of age, social conditions and the handicap itself, may be least able to cope with them. However, it must be noted that there are many deaf people not in this age group and the problem of fitting hard-of-hearing children especially with suitable hearing aids at a reasonable cost cannot be overlooked.

5. THE NATURE OF HEARING AIDS

A modern hearing aid is an electronic instrument designed to amplify sound. The main components of an aid are a microphone which receives sound waves and transforms them into electrical energy, an amplifier which amplifies the electrical energy, and a receiver attached to a molded earpiece or insert which transforms the electrical energy back into sound energy. This receiver is actually a loudspeaker. If the receiver and earpiece are worn in the user's ear, the hearing aid is of the air-conduction type, that is, the amplified sound waves are transmitted directly into the ear canal. When the receiver is worn behind the ear near the mastoid bone, it is of the bone-conduction type and the amplified sound waves are transmitted along the mastoid bone to the inner ear. Generally,

only one ear is fitted with a hearing aid (a monaural fitting) but both ears may be fitted in certain circumstances (a binaural fitting). Hearing aids are made in a variety of styles: aids in which the microphone and amplifier are worn on the body; aids in which these are housed in eyeglass frames or in a small container worn behind the ear; and in-the-ear hearing aids in which are contained all the components of a hearing aid. The development of transistors and, more recently, the integrated circuit together with the miniaturization of other electronic components have made possible smaller and smaller hearing aids.

The performance characteristics of hearing aids can be described and measured. The American National Standards Institute, Inc. has published a standard method for measurement of electroacoustical characteristics of hearing aids. (See Appendix III). Other standards are available, specifically standards for measurement of gain developed by the Hearing Aid Industry Conference (U.S.) and by Consumers Union.

Decibels (dB) are the units in which the loudness of sound is measured. A decibel is not an absolute unit but a logarithmic ratio between a given sound intensity and a reference sound. A convenient reference is a tone of 1,000 cycles per second at an intensity that can barely be heard by a normal person. Using this as the zero reference, a sound ten times as intense has a value of 10 decibels and a sound 100 (10^2) times as intense has a value of 20 decibels. A sound of the loudness of 140 decibels is 10^{14} times as intense as just audible sound. To increase a sound's loudness from 140 to 141 decibels requires 10 million times as much pressure as it would to increase a sound's loudness from 0 to 1 decibel. The gain of a hearing aid is the amplification of sound measured in decibels which the aid provides.

In-the-ear aids are suitable for mild impairments. People with profound impairments and children generally must wear an aid worn on the body. A major manufacturer's promotional literature gives the gain provided by the various models sold by it:

Peak gain of in-the-ear models	30 to 45 dB
Peak gain of behind-the-ear models	40 to 60 dB
Peak gain of eyeglass models	50 to 60 dB
Peak gain of body-worn aids	62 to 145 dB

The peak gain in the eyeglass model given here is conservative: eyeglass models will now have peak gains of 85 decibels.

Medical specialists in hearing, (otolaryngologists or otologists), audiologists and many dealers use audiometers in their diagnosis to measure the hearing disability. An audiometer is an electronic device for producing a limited number of pure tones whose volume can be changed at will by a volume control which is usually calibrated to read hearing losses directly. A chart on which is plotted the hearing loss at different frequencies is called an audiogram. Standards for audiometers have been developed by the American National Standards Institute, Inc.

In the United States, a three-year audiometer evaluation study was sponsored by the Public Health Service of the Department of Health, Education and Welfare. In this study, 100 audiometers used in North Carolina by state and municipal health departments, public school systems, speech and hearing centres, physicians, universities, hearing aid dealers, other diagnostic centres, the Veterans Administration, hospitals, the military and by industry were tested. The results of the tests were compared to the standard specifications. All the machines were out of

calibration either slightly or grossly. Forty-six instruments had never been calibrated after they had been purchased. Thirty-seven audiometers had been calibrated in the period between 1963 and 1965, that is, just preceding the study. Of the 54 instruments which had been calibrated, 27 had been checked by the manufacturer, 22 by the local hearing aid dealer, four by the owner and one by an electrician.

Since there is no requirement in Canada that audiometers be calibrated correctly, it is considered that a Canadian study of audiometers would show substantially similar results to the American study. If the instruments used to diagnose hearing losses are not calibrated accurately, the accuracy of the diagnosis is put in doubt.

Recommendations

(a) That provision be made under the Food and Drugs Act to require that all audiometers used during the treatment or in the diagnosis of hearing losses be recalibrated at appropriate intervals. The enforcement of this provision by the Food and Drug Directorate should be supported by the inspection services of the Department of Consumer and Corporate Affairs.

(b) That standards for measuring performance characteristics of hearing aids should be set up under the Food and Drugs Act.

(c) That regulations be passed under the Food and Drugs Act requiring each hearing aid sold in Canada to be accompanied by a statement of the performance characteristics of that aid.

6. BUYING A HEARING AID

The use of a hearing aid cannot effect immediate or complete rehabilitation of a person with a hearing loss. It is simply one way of treating such a loss although a very important way.

It is advisable for people with a hearing loss to consult a physician, more specifically an otolaryngologist or an otologist, before considering the purchase of a hearing aid. The specialist can determine the cause and nature of the hearing loss and may be able to recommend a course of treatment and advise whether a hearing aid could be useful.

There are many causes of deafness. Progressive hearing loss for high frequencies is characteristic of the aging process. Among other causes are impaired response of the bones or membranes of the middle ear, wax in the outer ear, ear canal inflammations, middle ear inflammations, congenital deformities of the ear canal, tumors and bony growths in the ear canal, eardrum abnormalities, allergies, injuries to the middle ear, obstruction of the Eustachian tube, otosclerosis, mastoiditis, arteriosclerosis, Ménière's disease, and exposure to loud noises. Where the underlying cause of the hearing loss cannot be reversed or relieved by medical treatment, such as treatment of the underlying infection, removal of the obstruction or surgery, a hearing aid may be necessary.

There are essentially two types of deafness, conduction deafness and nerve deafness. Conduction deafness usually involves a general loss of sensitivity for all sound frequencies. It is more likely to be amenable to medical-surgical treatment and to

be helped by a hearing aid. In nerve or perception deafness, the variety of sounds registered is diminished no matter how loud the noises are. In this type of hearing loss, it is much more difficult to improve hearing.

If the physician recommends a hearing aid, he may recommend a particular dealer or he may refer the patient to an audiologist who can assess the needs of the individual and determine by trial which model of hearing aid is most suited to the needs of the patient.

Audiologists customarily work in clinics or in association with other disciplines concerned with treating and assisting people with hearing losses. For example, the Canadian Hearing Society employs audiologists at its head office in Toronto to assess hearing needs and recommend hearing aids. Others are employed in hospitals, clinics and schools for hard-of-hearing children. There are approximately 300 audiologists working in Canada, many trained in the joint disciplines of speech therapy and audiology. However, it can be concluded that there is a shortage in Canada of audiologists.

Qualified audiologists must have taken courses and done clinical work at the graduate level. An article suggesting a training program for clinical audiologists is attached as Appendix IV. There are three universities in Canada giving post graduate training in audiology: McGill University, the Université de Montréal, and the University of Toronto.

A person contemplating the purchase of a hearing aid can only expect to get satisfaction from the purchase if he is aware of the nature of his hearing problem, the benefits he can

and cannot expect to get from using a hearing aid and the type of aid most suited to his hearing problem. He must know how to use and care for the hearing aid he purchases including how to wear it, how to set the gain and tone control for the conditions of the moment, how to rotate the batteries, how to effect minor repairs, and so on.

Moreover, the hearing aid may have to be supplemented by training in "speech reading". This is a more inclusive description than "lip reading" of the process of reading speech by paying intelligent attention to the movements of the lips and jaws of the speaker. Since hearing is needed in the normal process of learning and controlling speech, a hearing loss may cause abnormalities in speech and assistance may be needed in order to conserve normal speech patterns. Counselling or group therapy may also be needed where the person with a hearing loss is suffering from the depression mentioned earlier or where the deafness has accentuated and brought to the surface personality traits of suspicion, of being discriminated against and of hostility.

It is recognized that many users of hearing aids do not have the patience or perseverance to utilize their aid most effectively but the shortage of audiologists with supporting facilities makes it difficult, even for those who are willing and able, to achieve the optimum treatment.

A hearing aid dealer generally will test the hearing of an individual who wishes to buy a hearing aid, fit him with an aid considered suitable to his needs, offer advice on using the hearing aid and service hearing aids or obtain service for them. He usually will provide fittings in the homes of prospective

customers and may employ salesmen to do this work. Whether or not the dealer is able to fulfill these functions well depends on his experience, training and willingness to devote time and effort to this work.

There are no minimum standards of training for hearing aid dealers in Canada. It is virtually impossible under present circumstances for the average person to determine what qualifications a dealer has or what they mean. A dealer or hearing aid salesman may have little or no training or he may have studied courses in diagnosing and fitting hearing aids given by a manufacturer or sponsored by trade associations of hearing aid dealers. Responsible manufacturers grant franchises only on condition that the dealer take the courses the manufacturer provides. Such a course may consist of twenty lessons on sound, the testing of hearing, characteristics of hearing aids and the fitting of hearing aids. The tests provided by manufacturers on the knowledge acquired from these courses are not rigorous. Additional courses of increasing difficulty may be provided by the manufacturer for those dealers wishing to improve themselves. Some Canadian trade associations are encouraging their members to take courses based on the National Hearing Aid Society's Certification Course (U.S.) which has the approval of the Committee on Hearing Conservation of the American Academy of Ophthalmology and Otolaryngology. In 1968, there were 76 Canadian holders of the NHAS certificate.

Fitting a hearing aid is a difficult and time-consuming job and many dealers are handicapped in their work by the lack of training, inadequate equipment and a lack of knowledge of the performance characteristics of the instruments they are selling. Even those dealers who earnestly work to benefit their customers are subject to these handicaps.

Recommendations

(a) That provincial Departments of Education establish training courses for hearing aid dealers in technical colleges. Such courses should lead to a diploma or certificate. They should be available to graduates of secondary schools and to dealers who are operating at the time the course is established. Every effort should be made to have a uniform standard of training for all provinces.

(b) That the provinces pass legislation requiring the licensing of hearing aid dealers. The legislation should set out minimum training standards for dealers to go into effect within five years of the date when the legislation is passed. The standards should relate to the courses being offered in the provincial technical schools. Uniform legislation among the provinces should be sought.

(c) That the Department of Consumer and Corporate Affairs sponsor a Federal-Provincial Conference to recommend uniform standards of training for hearing aid dealers and uniform legislation to license hearing aid dealers. A sample of such a recommendation is found in Appendix V, Suggested State Legislation for the Selling and Fitting of Hearing Aids.

(d) That trade associations serving hearing aid dealers establish standards of training and conduct for their members. Those associations which have already done so should seek to improve training standards and practices in their trade.

(e) That the provincial Departments of Health should establish additional clinics for the hard-of-hearing staffed by medical specialists, audiologists and support staff at a sufficient

number of hospitals in the provinces so that medical and audiological advice is readily available to the entire population at a minimum cost.

(f) That the Department of Consumer and Corporate Affairs with the advice and assistance of the industry, other government departments and consumer groups provide consumers with information about hearing aids and their characteristics and uses and how to go about buying hearing aids.

(g) That the Department of Consumer and Corporate Affairs design a form for the benefit of consumers who could fill it out when a hearing aid is to be purchased. This form should be distributed by the Department of Consumer and Corporate Affairs, physicians, hearing aid dealers and consumer organizations. The form would have two functions; it would be a guide to the consumer as to the steps he should take and it would provide him with written information about hearing aids he is considering. It would indicate to the customer that he should seek the advice of a physician or an audiologist and provide a place to record the diagnosis made including the audiogram results and a note as to whether or not a hearing aid was recommended and what type. It would provide a place to write down the prices of the hearing aids considered, costs of operating the hearing aids, whether a trial period was available, what were the terms of the trial period, financing the sale, warranties, periodic checkups, and any other information considered relevant.

7. THE ORGANIZATION OF THE HEARING AID INDUSTRY

There is one major manufacturer of hearing aids in Canada and one other, much smaller, manufacturer. It is

estimated that Canada imports between 35,000 and 40,000 hearing aids annually, principally from the United States. Canadian production for sale in Canada brings the estimate of annual sales in Canada to between 38,000 and 44,000 hearing aids.

A manufacturer of hearing aids calculated that there are approximately 350 hearing aid dealers in Canada. If all those who sell fewer than 25 aids a year are eliminated, the total would be closer to 150.

8. THE PRICES OF HEARING AIDS

A survey of retail stores was conducted in May, 1969 by the Consumer Affairs Bureau of the Department of Consumer and Corporate Affairs to obtain the maximum and minimum prices of hearing aids. It showed that the usual low price for body-worn hearing aids was $85, for eyeglass models and behind-the-ear models it was $200 and for in-the-ear models it was $300. Retail prices as high as $400 were reported for a body-worn hearing aid and as high as $725 for an in-the-ear aid. If hearing aids are fitted to both ears at the same time the price may be reduced slightly from the price of two aids bought separately. These prices do not take into account variations in quality but are simply prices at which hearing aids are being sold.

The costs of operating a hearing aid vary so greatly that it is impossible to arrive at any estimate of average operating costs. The costs vary because the consumption of power supplied by batteries varies with the individual's requirements for amplification and with the frequency of use.

Costs of repairs and other maintenance also depend on the kind of hearing aid and the needs of the wearer. Most manufacturers and dealers provide an unconditional warranty on parts and labour for one year. After the warranty expires, some retailers have a minimum service charge for repairs, but this appears not to be usual. It is more usual for manufacturers to have a minimum service charge on hearing aids sent to them for repair. A $20 charge by the manufacturer was mentioned by many of the dealers in the survey. One dealer reported that the minimum service charge was a fixed percentage of the original cost of the hearing aid. This method of calculating repair costs would almost inevitably be unrelated to the actual repair costs. If the dealer is able to make the repairs, the time required to do it is reported to be about a day, while hearing aids repaired by manufacturers may be away a week or ten days and in some cases up to two weeks.

9. MARKUPS ON HEARING AIDS

The factory price for hearing aids, depending on the manufacturer and the type of hearing aid, varies roughly from 30 to 50 per cent of the suggested list price. On this basis the markup on cost would be 100 to 230 per cent. Out of his markup the hearing aid dealer must pay overhead, provide for depreciation on test equipment and inventory, make ear molds, advertise, pay salesmen's commissions and his own salary, and make a profit on his investment in the business. Salesmen's commissions usually are 35 per cent of the selling price and are considered along with other promotional expenses as necessary since those customers who have to be sought out buy unwillingly.

Hearing aid dealers maintain, in answer to criticisms that their markups are too high, that they do not make excessive profits. High gross margins and low profits on investment are not inconsistent where total sales in relation to capital investment are small. The number of dealers in Canada is greater than the market warrants and consequently total sales of individual firms are not large enough to justify the investments in offices, equipment and inventory. Under such circumstances it is not surprising that the emphasis in the retail trade for hearing aids is not on price competition but on competition in service and salesmanship. Indeed, the survival of an individual firm usually depends on its being able to sell at the highest price possible.

The competition in services and salesmanship generally takes the form of advertising and promotional expenses, employment of salesmen and provision of numerous, long consultations for fitting and adjusting hearing aids. In achieving customer satisfaction, quantity must not be confused with quality. Consumer dissatisfaction with hearing aid fittings is sufficient to warrant dealers' questioning the nature and quality of the services they provide as distinct from the quantity although some dealers should question this too. The key to improvements in services appears to be in improving the training standards for dealers. Promotions should be re-examined to determine whether enough emphasis is being put on promoting the use of hearing aids, that is on institutional advertising. If an increase in total sales is to be achieved by improvements in services and promotions, the increase should not be stifled by increases in retail prices.

10. TRADE PRACTICES IN THE HEARING AID INDUSTRY

Many dealers stock one brand of hearing aid only, while others may stock a number of brands. Manufacturers generally supply a full range of hearing aids, that is, body-worn models, in-the-ear, eyeglass and behind-the-ear models in one or more styles. Almost all dealers will provide financing for the purchase of hearing aids on credit.

Most dealers offer their customers an opportunity to try out a hearing aid, frequently before the aid has been purchased. A ten-day trial period is usual but some dealers allow thirty days and others offer more. If the trial period is allowed only after the purchase of the hearing aid, most dealers will refund the money paid for the hearing aid less the price of the ear mold which has been made for the individual. A usual price for an ear mold is $15 although prices of $20 are reported also.

Advertisements, promotions and salesmanship play a large part in the sale of hearing aids. People who are reluctant to admit to a hearing loss and who associate a social stigma with wearing a hearing aid are diffident about approaching a hearing aid dealer or salesman. Dealers have found that they must approach potential customers or make it very easy for the customer to approach them.

Advertisements for hearing aids generally appear in newspapers and magazines or in direct mail but are also broadcast on radio or television. Most advertisements encourage people to write to the firm to obtain free information, free dummy models of the hearing aid being advertised or a free catalogue.

Dealers will also invite people at exhibitions and fairs to enter contests for a hearing aid or to submit the names of people who could benefit from using a hearing aid. These methods are used to obtain the names of prospective customers. Advertisements generally mention only the smallest aids, that is the in-the-ear models, using such phrases as "concealed in the ear" or "an invisible hearing aid". The emphasis is primarily on the cosmetic advantages of the hearing aids and the services provided by the dealer with little emphasis on the performance characteristics of the hearing aid. Hearing aid manufacturers' advertisements and promotional material are usually more informative.

Few complaints have been received that advertisements in newspapers and magazines were misleading but some advertisements have been observed there or in promotional literature which are open to the criticism that they tend to mislead by making exaggerated claims for the performance and size of the hearing aids advertised. Such claims as "instant hearing", "a new way to better hearing", "a modern miracle", "spectacular invention", "truly HOPE for the hard of hearing", "so tiny it can hide behind a dime", and others must raise hopes which cannot be realized for improvements in hearing and concealment of a hearing loss.

Section 33D of the Combines Investigation Act prohibits the publication of false advertisements (see Appendix I). Section 19 of the Food and Drugs Act prohibits the selling or advertising of any device in a manner that is false, misleading or deceptive or is likely to create an erroneous impression regarding its character, value, composition, merit or safety (see Appendix I). No prosecutions relating to hearing aids have been reported under these sections.

Advertising guidelines have been established by associations of hearing aid dealers for their members. The Canadian Advertising Advisory Board also has put out a code of advertising ethics to which most publishers adhere. This code seeks to establish advertising standards and to prevent advertisements which, among other things, contain false, misleading, unwarranted or exaggerated claims or claims which cannot be substantiated, which offer false hope in the form of a cure or relief for the physically handicapped either on a temporary or permanent basis, which contain false or misleading testimonials, which distort the true meaning of a statement made by professionals or scientific authorities or which are made to appear to have a scientific basis they do not possess, or which offer a guarantee or warranty and do not fully explain its conditions. Manufacturers of hearing aids who co-operate with dealers in paying for advertisements generally require that the advertising copy be submitted to them for approval.

Door-to-door salesmen are used frequently to make contacts with prospective customers. Most of the provinces now have legislation requiring the licensing of itinerant salesmen and providing for the posting of a bond for licensed itinerant salesmen. This legislation can be used by provincial authorities to control abuses in door-to-door selling. Many provinces also have legislation which gives purchasers of goods bought at their homes or elsewhere than the salesman's place of business the right to rescind within a stated period, say three days, a contract to purchase goods on credit. This "cooling off" period permits purchasers to reconsider free of pressure whether or not they wish to enter into a contract.

One woman living in a rural area submitted a complaint which is typical of the complaints about the door-to-door selling of hearing aids. She had been wearing for seventeen years a satisfactory hearing aid for which she had paid $59.00. In 1966, a hearing aid salesman came to her home and for $738 in cash undertook to order binaural eyeglass-style hearing aids, delivery to be made in three weeks. When no hearing aids had been received after several months, the woman travelled to the city where the dealer who employed the salesman was located. Here she was told that the salesman had been fired because he did not have a licence. However, the dealer fitted an aid for the left ear. A year later, he supplied an aid for the right ear. The aid in the left ear was too tight and the aid in the right ear did not give any hearing. Sixteen months after the payment for the hearing aids, she returned the hearing aids to the dealer. She had received no recompense or replacement for the unsatisfactory hearing aids. This woman also knew of another woman, ninety years old, who had paid the same dealer $738 for a hearing aid with which she could not hear.

Another frequent complaint was that refunds are not made when hearing aids are unsatisfactory even though the salesman or dealer has promised such refunds if satisfaction is not obtained. Such a complaint was received from an elderly woman who was put off on several occasions by the dealer when she tried to contact him to get a refund only to be told when she was able to get in touch with him that he could not give a refund because the sale had been made so long before. This complainant also stated that the hearing aid which was sold to her as new was visibly scratched and she had concluded that it

was not new. Another complainant who tried to get a refund was refused it and sold another hearing aid on the understanding that the salesman would sell the first hearing aid for her and apply the amount received for it to the purchase of the new hearing aid. The complainant ended up paying the full price of both hearing aids, $638, as the first aid was not sold. In this case and in another, similar case, the salesman of the first hearing aid left the business and the dealer who took over sold the second hearing aid and, although willing to take responsibility for that aid, was not prepared to honour the commitments on the first aid.

Complaints were made also that hearing aids were sold on the basis of tests made by dealers or salesmen. Later examinations by doctors indicated that these test results were incorrect. Other complaints indicated that dealers and salesmen sold hearing aids to customers which they could not adjust to the customer's satisfaction despite repeated attempts to make such adjustments.

Sections 323, 351 and 354 of the Criminal Code (see Appendix I) which is administered by the provincial Attorneys General set out the offences of fraud, passing off and sale of used goods without disclosure. Also Section 19(1) of the Food and Drugs Act (see Appendix I) prohibits, in the case of devices, false, misleading or deceptive selling practices. This Act is administered by the Food and Drug Directorate of the Department of National Health and Welfare.

Recommendation

That the Department of Consumer and Corporate Affairs publish for the use of the hearing aid

industry and the public a code of acceptable trade practices for hearing aid dealers. A proposed code is set out in Appendix VI.

11. RECOMMENDATIONS OF THE SUBCOMMITTEE ON HEARING AIDS

Recommendations of the Subcommittee on Hearing Aids:

1. That hearing aid manufacturers, distributors and retailers and associations interested in promoting the welfare of the hard-of-hearing initiate an advertising campaign to inform the public about hearing disabilities, prospects for treatment, limitations and capabilities of hearing aids and the ways in which friends and family can assist people with hearing losses.

2. (a) That provision be made under the Food and Drugs Act to require that all audiometers used during the treatment or in the diagnosis of hearing losses be recalibrated at appropriate intervals. The enforcement of this provision by the Food and Drug Directorate should be supported by the inspection services of the Department of Consumer and Corporate Affairs.

(b) That standards for measuring performance characteristics of hearing aids should be set up under the Food and Drugs Act.

(c) That regulations be passed under the Food and Drugs Act requiring each hearing aid sold in Canada to be accompanied by a statement of the performance characteristics of that aid.

3. (a) That provincial Departments of Education establish training courses for hearing aid dealers in technical colleges. Such courses should lead to a diploma or certificate. They should be available to graduates of secondary schools and to dealers who are operating at the time the course is established. Every effort should be made to have a uniform standard of training for all provinces.

(b) That the provinces pass legislation requiring the licensing of hearing aid dealers. The legislation should set out minimum training standards for dealers to go into effect within five years of the date when the legislation is passed. The standards should relate to the courses being offered in the provincial technical schools. Uniform legislation among the provinces should be sought.

(c) That the Department of Consumer and Corporate Affairs sponsor a Federal-Provincial Conference to recommend uniform standards of training for hearing aid dealers and uniform legislation to license hearing aid dealers. A sample of such a recommendation is found in Appendix V, Suggested State Legislation for the Selling and Fitting of Hearing Aids.

(d) That trade associations serving hearing aid dealers establish standards of training and conduct for their members. Those associations which have already done so should seek to improve training standards and practices in their trade.

(e) That the provincial Departments of Health should establish additional clinics for the hard-of-hearing staffed by medical specialists, audiologists and support staff at a sufficient number of hospitals in the provinces so that medical and audiological advice is readily available to the entire population at a minimum cost.

(f) That the Department of Consumer and Corporate Affairs with the advice and assistance of the industry, other government departments and consumer groups provide consumers with information about hearing aids and their characteristics and uses and how to go about buying hearing aids.

(g) That the Department of Consumer and Corporate Affairs design a form for the benefit of consumers who could fill it out when a hearing aid is to be purchased. This form should be distributed by the Department of Consumer and Corporate Affairs, physicians, hearing aid dealers and consumer organizations. The form would have two functions; it would be a guide to the consumer as to the steps he should take and it would provide him with written information about hearing aids he is considering. It would indicate to the customer that he should seek the advice of a physician or an audiologist and provide a place to record the diagnosis made including the audiogram results and a note as to whether or not a hearing aid was recommended and what type. It would provide a place to write down the prices of the hearing aids considered, costs of operating the hearing aids, whether a trial period was available, what were the terms of the trial period, financing the sale, warranties, periodic checkups, and any other information considered relevant.

4. That the Department of Consumer and Corporate Affairs publish for the use of the hearing aid industry and the public a code of acceptable trade practices for hearing aid dealers. A proposed code is set out in Appendix VI.

A. FOOD AND DRUGS ACT

Devices.

18. No person shall sell any device that, when used according to directions or under such conditions as are customary or usual, may cause injury to the health of the purchaser or user thereof.

19. (1) No person shall label, package, treat, process, sell or advertise any device in a manner that is false, misleading or deceptive or is likely to create an erroneous impression regarding its character, value, composition, merit or safety.

(2) A device that is not labelled or packaged as required by the regulations, or is labelled or packaged contrary to the regulations, shall be deemed to be labelled or packaged contrary to subsection (1).

20. Where a standard has been prescribed for a device, no person shall label, package, sell or advertise any article in such a manner that it is likely to be mistaken for such device, unless the article complies with the prescribed standard.

Regulations.

24. (1) The Governor in Council may make regulations for carrying the purposes and provisions of this Act into effect, and, in particular, but not so as to restrict the generality of the foregoing, may make regulations

(a) declaring that any food or drug or class of food or drugs is adulterated if any prescribed substance or class of substances is present therein or has been added thereto or extracted or omitted therefrom;

(b) respecting

(i) the labelling and packaging and the offering, exposing and advertising for sale of food, drugs, cosmetics and devices,

(ii) the size, dimensions, fill and other specifications of packages of food, drugs, cosmetics and devices,

(iii) the sale or the condition of sale of any food, drug, cosmetic or device, and

(iv) the use of any substance as an ingredient in any food, drug, cosmetic or device,

to prevent the consumer or purchaser thereof from being deceived or misled as to its quantity, character, value, composition, merit or safety or to prevent injury to the health of the consumer or purchaser;

(c) prescribing standards of composition, strength, potency, purity, quality or other property of any article of food, drug, cosmetic or device;

(d) respecting the importation of foods, drugs, cosmetics and devices in order to ensure compliance with this Act and the regulations;

(e) respecting the method of preparation, manufacture, preserving, packing, storing and testing of any food, drug, cosmetic or device in the interest of, or for the prevention of injury to, the health of the consumer or purchaser;

(f) requiring persons who sell food, drugs, cosmetics or devices to maintain such books and records as the Governor in Council considers necessary for the proper enforcement and administration of this Act and the regulations;

(g) respecting the form and manner of the Minister's indication under section 12, including the fees payable therefor, and prescribing what premises or what processes or conditions of manufacture, including qualifications of technical staff, shall or shall not be deemed to be suitable for the purposes of that section;

(h) requiring manufacturers of any drugs described in Schedule E to submit test portions of any batch of such drugs and respecting the form and manner of the Minister's indication under section 13, including the fees payable therefor;

(i) not inconsistent with this Act, respecting the powers and duties of inspectors and analysts and the taking of samples and the seizure, detention, forfeiture and disposition of articles;

(j) exempting any food, drug, cosmetic or device from all or any of the provisions of this Act and prescribing the conditions of such exemption;

(k) prescribing forms for the purposes of this Act and the regulations;

(l) providing for the analysis of food, drugs or cosmetics other than for the purposes of this Act and prescribing a tariff of fees to be paid for such analysis;

(m) adding anything to any of the Schedules, in the interest of, or for the prevention of injury to, the health of the consumer or purchaser, or deleting anything therefrom

(n) respecting the distribution or the conditions of distribution of samples of any drug; and

(o) respecting

(i) the method of preparation, manufacture, preserving, packing, labelling, storing and testing of any new drug, and

(ii) the sale or the conditions of sale of any new drug, and defining for the purposes of this Act the expression "new drug".

(2) The Governor in Council may designate as an analyst or inspector any person on the staff of the department for such time as that person is employed in the department or for such time during the period of such employment as he may direct.

* AN ACT TO AMEND THE FOOD AND DRUGS ACT AND THE NARCOTIC CONTROL ACT AND TO MAKE A CONSEQUENTIAL AMENDMENT TO THE CRIMINAL CODE

(2) Paragraph (e) of section 2 of the said Act is repealed and the following substituted therefor:

"(e) "device" means any article, instrument, apparatus or contrivance, including any component, part or accessory thereof, manufactured, sold or represented for use in

(i) the diagnosis, treatment, mitigation or prevention of a disease, disorder or abnormal physical state, or the symptoms thereof, in man or animal,

(ii) restoring, correcting or modifying a body function or the body structure of man or animal,

(iii) the diagnosis of pregnancy in humans or animals, or

(iv) the care of humans or animals during pregnancy and at and after birth of the offspring, including care of the offspring,

and includes a contraceptive device but does not include a drug;"

* Note: Proclaimed in force August 18, 1969. (SOR/69-428, Canada Gazette, Part II, Vol. 103, No. 17).

B. COMBINES INVESTIGATION ACT

*33D (1) Every one who publishes or causes to be published an advertisement containing a statement that purports to be a statement of fact but that is untrue, deceptive or misleading or is intentionally so worded or arranged that it is deceptive or misleading, is guilty of an indictable offence and is liable to imprisonment for five years, if the advertisement is published

(a) to promote, directly or indirectly, the sale or disposal of property or any interest therein, or

(b) to promote a business or commercial interest.

(2) Every one who publishes or causes to be published in an advertisement a statement or guarantee of the performance, efficacy or length of life of anything that is not based upon an adequate and proper test of that thing, the proof of which lies upon the accused, is, if the advertisement is published to promote, directly or indirectly, the sale or disposal of that thing, guilty of an offence punishable on summary conviction.

(3) Subsections (1) and (2) do not apply to a person who publishes an advertisement that he accepts in good faith for publication in the ordinary course of his business.

(4) For the purposes of subsection (2), a test that is made by the National Research Council of Canada or by any other public department is an adequate and proper test, but no reference shall be made in an advertisement to indicate that a test has been made by the National Research Council or other public department unless the advertisement has, before publication, been approved and permission to publish it has been given in writing by the President of the National Research Council or by the deputy head of the public department, as the case may be.

(5) Nothing in subsection (4) shall be deemed to exclude, for the purposes of this section, any other adequate or proper test.

---

*Note: Proclaimed in force July 31, 1969. (SOR/69-390, Canada Gazette, Part II, Vol. 103, No. 15)

C. CRIMINAL CODE PROVISIONS

FRAUD. - Affecting public market.

323. (1) Every one who, by deceit, falsehood or other fraudulent means, whether or not it is a false pretence within the meaning of this Act, defrauds the public or any person, whether ascertained or not, of any property, money or valuable security, is guilty of an indictable offence and is liable to imprisonment for ten years.

(2) Every one who, by deceit, falsehood or other fraudulent means, whether or not it is a false pretence within the meaning of this Act, with intent to defraud, affects the public market price of stocks, shares, merchandise or anything that is offered for sale to the public, is guilty of an indictable offence and is liable to imprisonment for ten years.

PASSING OFF.

351. Every one commits an offence who, with intent to deceive or defraud the public or any person, whether ascertained or not,

(a) passes off other wares or services as and for those ordered or required, or

(b) makes use, in association with wares or services, of any description that is false in a material respect as to

(i) the kind, quality, quantity or composition,

(ii) the geographical origin, or

(iii) the mode of the manufacture, production or performance of such wares or services.

USED GOODS SOLD WITHOUT DISCLOSURE.

354. Every one commits an offence who sells, exposes or has in his possession for sale, or advertises for sale, goods that have been used, reconditioned or remade and that bear the trade mark or the trade name of another person, without making full disclosure that the goods have been reconditioned, rebuilt or remade for sale and that they are not then in the condition in which they were originally made or produced.

APPENDIX II

ASSOCIATIONS PRESENTING BRIEFS TO THE SUBCOMMITTEE ON HEARING AIDS

Consumers' Association of Canada

Association of Canadian Better Business Bureaux, Incorporated

The Canadian Hearing Society

The Canadian Hearing Society of Quebec

Canadian Otolaryngological Society

Ontario Hearing Aid Association

The Society for Crippled Children and Adults of Manitoba

Better Business Bureau of Edmonton

Unitron Industries Limited

Zenith Radio Corporation of Canada Limited

Philips Appliances Limited

Pre School Deaf and Hard of Hearing Association

Greater Vancouver Hearing Aid Dealers' Association

APPENDIX III

ASA
Reg. U.S. Pat. Off.
S3.3-1960
Revision of
Z24.14-1953
UDC 681.88:534.6

American Standard Methods for Measurement of

Electroacoustical Characteristics of Hearing Aids

USA STANDARD

This USA Standard is one of nearly 3000 standards approved as American Standards by the American Standards Association. On August 24, 1966, the ASA was reconstituted as the United States of America Standards Institute. Standards approved as American Standards are now designated USA Standards. There is no change in their index identification or technical content.

Sponsor

Acoustical Society of America

Approved October 31, 1960

AMERICAN STANDARDS ASSOCIATION
INCORPORATED

American Standard

Registered United States Patent Office

An American Standard implies a consensus of those substantially concerned with its scope and provisions. The consensus principle extends to the initiation of work under the procedure of the Association, to the method of work to be followed, and to the final approval of the standard.

An American Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American Standard does not in any respect preclude any party who has approved of the standard from manufacturing, selling, or using products, processes, or procedures not conforming to the standard.

An American Standard defines a product, process, or procedure with reference to one or more of the following: nomenclature, composition, construction, dimensions, tolerances, safety, operating characteristics, performance, quality, rating, certification, testing, and the service for which designed.

American Standards are subject to periodic review. They are reaffirmed or revised to meet changing economic conditions and technological progress. Users of American Standards are cautioned to secure the latest editions.

Producers of goods made in conformity with an American Standard are encouraged to state on their own responsibility in advertising, promotion material, or on tags or labels, that the goods are produced in conformity with particular American Standards. The inclusion in such advertising and promotion media, or on tags or labels, of information concerning the characteristics covered by the standard to define its scope is also encouraged.

Published by

AMERICAN STANDARDS ASSOCIATION
INCORPORATED
10 East 40th Street, New York 16, N. Y.

Universal Decimal Classification 681.88:534.6

Printed in U.S.A.

D2M1260/1

Foreword

(This Foreword is not a part of American Standard Methods for Measurement of Electroacoustical Characteristics of Hearing Aids, S3.3-1960.)

This American Standard comprises a part of a group of definitions, standards, and specifications for use in acoustical work. It has been developed under the Sectional Committee Method of ASA procedure, under the sponsorship of the Acoustical Society of America.

This standard parallels as closely as practicable International Electrotechnical Commission Publication 118, Recommended Methods for Measurement of the Electro-acoustical Characteristics of Hearing Aids.

The S3 Committee, under whose jurisdiction this standard was developed, has the following scope:

Standards, specifications, methods of measurement and test, and terminology, in the fields of psychological and physiological acoustics, including aspects of general acoustics which pertain to biological safety, tolerance, and comfort.

Various subcommittees have been organized to take care of the committee's program, and this standard was developed by Subcommittee S3-W-34, whose personnel is shown on the following page.

Suggestions for improvement gained in the use of this standard will be welcomed. They should be sent to the American Standards Association, Incorporated, 10 East 40th Street, New York 16, N. Y.

The organizations which participated in this work and the names of their representatives, as listed at the time this standard was submitted to the S3 Sectional Committee for approval, are as follow:

W. D. NEFF, *Chairman* H. E. VON GIERKE, *Vice-Chairman*

S. DAVID HOFFMAN, *Secretary*

Organization Represented	*Name of Representative*
Acoustical Materials Association	L. F. YERGES
Acoustical Society of America	W. D. NEFF H. E. VON GIERKE
American Academy of Ophthalmology and Otolaryngology	E. P. FOWLER, JR
American Conference of Governmental Industrial Hygienists	C. D. YAFFE
American Industrial Hygiene Association	P. L. MICHAEL
American Institute of Electrical Engineers	E. G. THURSTON
American Otological Society, Inc	G. D. HOOPLE
American Society of Safety Engineers	T. R. LEADBEATER
American Society for Testing Materials	R. BENSON
American Speech and Hearing Association	E. T. CURRY
Association of Casualty and Surety Companies	W. A. HOUGH H. B. PERRY *(Alt)*
Canadian Standards Association *(Liaison)*	T. D. NORTHWOOD
Electric Light and Power Group	C. S. MURRAY C. K. POARCH *(Alt)*
Hearing Aid Industry Conference, Inc	S. F. LYBARGER
Industrial Medical Association	GREYDON BOYD
Industrial Safety Equipment Association, Inc	P. L. MICHAEL
National Association of Mutual Casualty Companies	R. L. YOUNG E. G. MEITER *(Alt)*
National Bureau of Standards, U. S. Department of Commerce	R. K. COOK (MRS) E. L. R. CORLISS *(Alt)*
National Electrical Manufacturers Association	R. O. FEHR
Society of Automotive Engineers, Inc	R. N. JANEWAY
Telephone Group	W. A. MUNSON
U. S. Army Medical Corps	J. P. ALBRITE R. E. SHUTTS *(Alt)*
U. S. Army Signal Corps	P. E. GRIFFITH
U. S. Department of the Air Force	HORACE O. PARRACK RONALD G. HANSEN *(Alt)*

Organization Represented	*Name of Representative*
U. S. Department of the Navy, Bureau of Medicine and Surgery	J. D. HARRIS
U. S. Department of the Navy, Bureau of Ships, Code 621	D. HUGHES
	E. L. MARTIN *(Alt)*
U. S. Public Health Service	LOUIS PECORA
	H. H. JONES *(Alt)*
Members-at-Large	LAURENCE BATCHELDER
	L. L. BERANEK
	HALLOWELL DAVIS
	F. V. HUNT
	H. S. KNOWLES
	V. O. KNUDSEN
	A. P. G. PETERSON
	H. M. TRENT
	R. W. YOUNG

Writing Group S3-W-34 on Hearing Aids, which prepared this standard, had the following personnel:

S. F. LYBARGER, *Chairman*

G. DONALD CAUSEY
(MRS) EDITH L. R. CORLISS
ROBERT GEIB
J. DONALD HARRIS
KENNETH O. JOHNSON
HUGH S. KNOWLES
FRED W. KRANZ
ROBERT LESNICK
CLAYTON MULLIN
HARRY PEARSON

WARREN R. WALTERS

Contents

American Standard Methods for Measurement of Electroacoustical Characteristics of Hearing Aids

1. Purpose and Scope

1.1 The purpose of this standard is to describe practicable and reproducible methods of determining certain physical performance characteristics of air-conduction hearing aids that use electronic amplification and acoustic coupling to the ear canal by means of ear inserts, e.g., ear molds or similar devices. This standard does not apply when automatic gain control is in use. The methods specified here give information on the measurement of:

1.2 The acoustical test procedure is based on the free-field technique, in which the hearing aid is placed in a plane progressive wave with the earphone coupled to a standardized coupler.

1.3 The results obtained by the methods specified herein express the performance under the conditions of the test, but will not necessarily agree exactly with the performance of the hearing aid under practical conditions of use. For this reason, the difference between practical and test conditions must be borne in mind in interpreting the test results.

2. Definitions

2.1 Coupler. A coupler is a device for the acoustic loading of earphones. It has a specified arrangement of acoustic elements and is provided with a microphone for the measurement of the sound pressure developed in a specified portion of the device.

2.2 Substitution Method. The substitution method is a method of measurement of the response of a hearing aid in which the hearing aid and the microphone employed to measure the free-field sound pressure are placed alternately at the same point (the test point) in the sound field.

2.3 Comparison Method. The comparison method is an alternative method of measurement of the response of a hearing aid, sometimes employed for reasons of practical convenience, in which the hearing aid and the microphone employed to monitor the free-field sound pressure are placed at two different points in the sound field.

2.4 Reference Point. The reference point (of a hearing aid) is a point on the hearing aid chosen for the purpose of defining its position. (See 4.3.)

2.5 Test Point. The test point is a position in the test enclosure to which the measurements of the free-field pressure are referred, and at which the reference point of the hearing aid is located for test purposes. (See 4.2.1.)

2.6 Air-to-Air Gain or Acoustic Gain (at a Specified Frequency and Under Specified Operating Conditions). Acoustic gain is the amount, in decibels, by which the sound pressure level developed by the hearing-aid earphone in a specified coupler exceeds the sound pressure level in the free field into which the hearing aid, or its microphone, if separate, is introduced.

2.7 Maximum Air-to-Air Gain or Maximum Acoustic Gain (at a Specified Frequency). Maximum acoustic gain is the maximum value of the acoustic gain obtainable from the hearing aid.

2.8 Full-on Gain (at a Specified Frequency). Full-on gain is the acoustic gain of the hearing aid with its gain control at maximum setting and with a stated input sound pressure level.

2.9 Frequency Response. Frequency response is the relative acoustic gain of the hearing aid expressed as a function of the frequency.

2.10 Comprehensive Frequency Response. The comprehensive frequency response is a family of frequency responses (frequency-response curves) arranged in such a way as to exhibit the input-output characteristics of the hearing aid.

2.11 Basic Frequency Response. Basic frequency response is the frequency response for a specified input sound pressure level, maintained constant over the specified frequency range, and a speci-

fied output sound pressure level at 1,000 cps (cycles per second), that is chosen as a reference response for purposes of description.

2.12 Saturation Sound Pressure Level (at a Specified Frequency and Under Specified Operating Conditions). Saturation sound pressure level is the maximum rms (root mean square) sound pressure level obtainable in the coupler from the earphone of the hearing aid allowing all possible values of the input sound pressure level.

3. Test Equipment

3.1 General

3.1.1 ***Sound Pressure Levels.*** Throughout this standard all sound pressure levels specified are referred to 20 $\mu N/m^2$ (0.0002 microbar).

3.1.2 ***Effects of Unwanted Stimuli.*** Unwanted stimuli, such as ambient noise or stray fields, measured with the systems for sound pressure measurements as specified in 3.5, shall be sufficiently low so as not to affect the test results by more than 0.5 db (decibel).

3.2 Acoustical Requirements for the Test Enclosure. The test enclosure shall, in the position to be used, provide essentially free-field conditions over the frequency range of 200 to 5,000 cps or the equivalent progressive wave conditions.

3.3 Sound Source. The sound source shall be capable of maintaining at the test point the requisite sound pressure level within the following tolerances:

(1) When the substitution method is used, ± 1 db

(2) When the comparison method is used, ± 1.5 db over the frequency range 200–3,000 cps and ± 2.5 db over the frequency range 3,000–5,000 cps

For response measurements, the total harmonic distortion of the source shall not exceed 2.0 percent. For distortion measurements, the total harmonic distortion of the source shall not exceed 0.5 percent.

NOTE 1: The above tolerances are to apply to sound pressure level *readings* made with equipment meeting the requirements of 3.5.3(1) and (2).

NOTE 2: The above tolerances apply to all free-field sound pressure levels mentioned hereafter in the standard.

3.4 Coupler. The coupler to be used for air-conduction earphones requiring an insert in the ear canal shall consist of a single cylindrical cavity with an acoustic tube, located on the axis of the cylinder, connecting it to the earphone. The dimensions of the acoustic tube will depend on the type of earphone and the way the earphone is coupled to the ear.

The cavity portion of the coupler shall be constructed of hard, nonporous and nonmagnetic material.

3.4.1 ***Coupler Cavity.*** Refer to Fig. 1.

3.4.1.1 The cavity shall have a net effective volume of 2.0 cc (cubic centimeters) ± 2 percent. The dimensions should take into account a front cavity, if any, associated with the microphone, a finite microphone diaphragm impedance, any protective grid on the microphone, etc.

3.4.1.2 The diameter of the cavity shall not be less than 0.709 inches [18 mm (millimeters)] or greater than 0.827 inches (21 mm).

3.4.1.3 The diaphragm of the standard pressure microphone shall be coaxial with the cylindrical cavity and, whenever possible, be co-planar with its base. The acoustic tube shall enter the cavity and terminate at the center of the base opposite the microphone diaphragm.

3.4.1.4 A fine capillary tube partially filled in its total length by a wire shall lead from outside to the 2-cc volume to allow for equalization of static pressure. The influence of the capillary tube on the impedance of the 2-cc volume shall be less than 1 percent in the frequency range 200–5,000 cps.

NOTE: For the Type L standard pressure microphone frequently employed (Western Electric Type 640-AA), the diaphragm impedance, up to about 5,000 cps, is almost a pure stiffness reactance and can be conveniently expressed as an "equivalent volume." This is the volume of a rigid cavity whose acoustic impedance equals the diaphragm impedance. (See American Standard Specification for Laboratory Standard Pressure Microphones, Z24.8-1949, Section 2.8.)

For the 640-AA, this equivalent volume averages about 0.12 cc.

For Type M standard pressure microphones (such as Massa M-101), the equivalent volume of the microphone is negligible, and no correction for the finite diaphragm impedance is needed.

For the 640-AA microphone, the cavity in front of the diaphragm has an average volume of 0.54 cc. The net physical volume needed in the upper part of the cavity would then be 2.0 — 0.12 — 0.54 = 1.34 cc.

A cavity of 0.735 inches (18.67 mm) in diameter (approximately that of the 640-AA diaphgram) would require a length of 0.193 inches (4.90 mm) to provide this volume.

3.4.2 ***Standardized Types of Couplers.*** One general and two specific forms of couplers using the coupler cavity described in 3.4.1 are recommended. All three forms conform to an International Electrotechnical Commission Recommendation under consideration by IEC Technical Committee 29 on Electroacoustics.

3.4.2.1 *Type HA-1 Coupler.* This general form of coupler is shown in Fig. 2 and is adapted to test earphones using plastic tubing, actual earmolds, etc.

The acoustic tube consists of the particular type and dimensions of tubing, insert, and coupling supplied or specified by the manufacturer, or the hole in other devices that conducts sound from the ear-

phone to the cavity, such as a custom earmold. The test results should state the nature, dimensions, and materials of the components forming the acoustic tube.

3.4.2.2 *Type HA-2 Coupler.* For earphones provided with a nub or otherwise directly connected to an ear insert, the dimensions of the acoustic tube shall be in accordance with Fig. 3.

NOTE: This form is essentially the same as the Type 2 coupler for insert-type earphones described in American Standard Method for Coupler Calibration of Earphones, Z24.9-1949.

3.4.2.3 *Type HA-3 Coupler.* For greater constancy and reproducibility in testing earphones with long nubs adapted to engage soft earmolds or tubing, the rigid acoustic tube arrangement of Fig. 4 may be employed. The test results should state the diameter and length of the acoustic tube.

3.5 Apparatus for Measurement of Sound Pressure Level

3.5.1 ***Pressure Microphone for Measurement of Free-Field Sound Pressure Level.*** The microphone shall be provided with a free-field calibration.

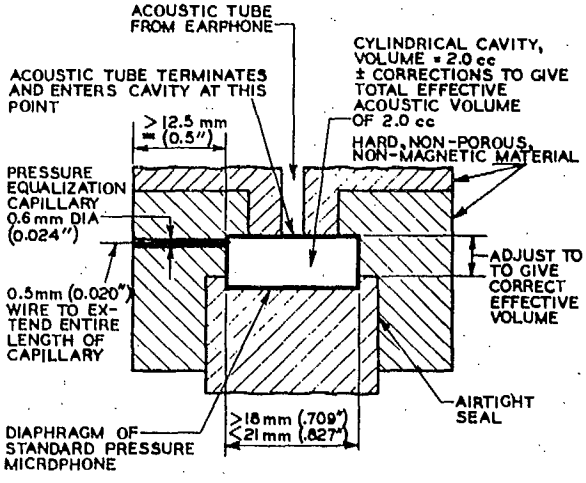


Fig. 1
Coupler Cavity

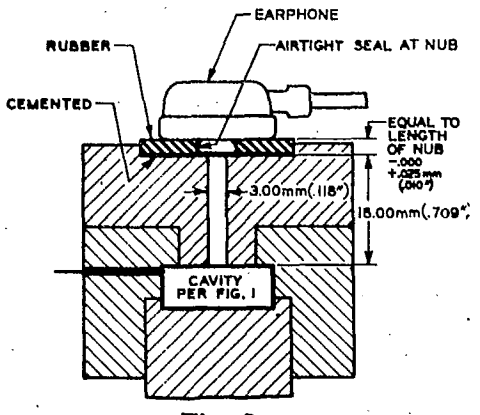


Fig. 3
Type HA-2 Coupler

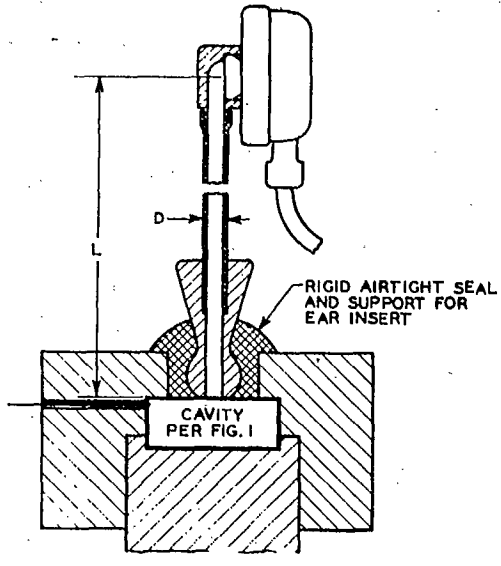


Fig. 2
Type HA-1 Coupler

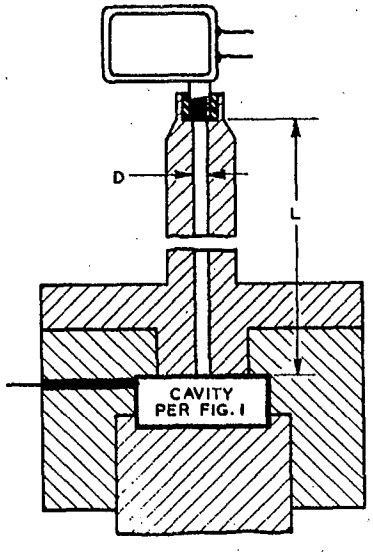


Fig. 4
Type HA-3 Coupler

NOTE: For typical Western Electric 640-AA standard pressure microphones, the cavity diameter would be 0.735 inch and the height of the coupler portion of the cavity 0.193 inch. The volume of the cavity in front of the microphone diaphragm would be 0.54 cc and the equivalent volume of the diaphragm due to its compliance, 0.12 cc, leaving a net volume of 1.34 cc needed in the coupler portion of the cavity to provide a net total of 2 cc.

3.5.2 ***Pressure Microphone for Measurement of Coupler Sound Pressure Level.*** The microphone shall be provided with a pressure calibration.

NOTE: American Standard Specification for Laboratory Standard Pressure Microphones, Z24.8-1949 (see Section 6), and American Standard Method for the Pressure Calibration of Laboratory Standard Pressure Microphones, Z24.4-1949 (see Section 6), describe suitable standard microphones and methods for the calibration thereof.

3.5.3 ***Sound Pressure Measurement System.*** The apparatus used for measurement of the free-field sound pressure level at the test point, and the coupler sound pressure level produced by the hearing-aid earphone, shall comply with the following specifications:

(1) The frequency response shall be flat within ± 1 db in the frequency range 200–5,000 cps.

NOTE: If under certain conditions it is necessary to use a selective measuring system in order to insure that response of the hearing aid to the signal can be differentiated from inherent noise in the hearing aid, such a selective system may be used, provided this is stated in the report.

Reasonable departures from the above flatness of response may be made, provided the results are corrected accordingly.

(2) The over-all calibration of the sound pressure measurement system shall be accurate to within ± 1 db, including the calibration tolerance of the standard pressure microphone.

NOTE: If the calibration of the sound measurement system depends on temperature, relative humidity, and static pressure, corrections for such dependence shall be made when necessary.

(3) The percentage total-harmonic distortion shall be less than 1.5 percent for sound pressure levels up to 130 db in the frequency range 200–5,000 cps.

(4) For sine-wave signals, the accuracy of the output indicator shall be included in the tolerance permitted in (2), above. For nonsine-wave signals, an additional output indicator error, causing a departure no more than 1 db from the reading that would be obtained if the output indicator were a true rms device, is permissible.

NOTE: It is well known that the type of output indicator employed may influence the test results significantly if a nonsinusoidal voltage is being measured. Such nonsinusoidal voltages may be present when making measurements of comprehensive frequency response with high-level inputs, when determining the saturation output curve, and when measuring the harmonic distortion.

3.6 Additional Apparatus for Automatic Recording of Frequency Response. The following additional apparatus may be employed:

(1) Equipment that is capable of automatically maintaining the requisite sound pressure level at the test point

(2) An automatic level recorder to be used as output indicator

NOTE: See the note to 3.5.3(4) regarding the influence of the characteristic of the level recorder on the test results.

4. Test Conditions

4.1 General. Procedures are given in this section for calibrating the sound field and locating the hearing aid.

The test results obtained by the substitution method, using point-by-point measurement, shall be considered basic.

4.2 Calibrating the Sound Field

4.2.1 ***Choice of a Test Point.*** With the position of the sound source fixed in the test enclosure, a test point is chosen at a sufficient distance from the source so that there is an approximately plane wave front over the relatively small area of the hearing aid. The distance from the sound source to the test point must be sufficient to prevent objectionable interreflection effects between the sound source and the hearing aid when the latter is located at the test point. The test point must be defined accurately.

The test point may be on the axis of the sound source when making measurements using the substitution method.

4.2.2 ***Measurement of the Sound Pressure Level.*** The pressure microphone shall be placed so that the point of the microphone for which the calibration (in terms of its free-field sensitivity) applies is placed at the test point. It is important to note that the orientation of the pressure microphone should be in accordance with the orientation used at the calibrating laboratory.

The technique used for the actual calibration of the sound field differs for the substitution and comparison methods:

(1) *Substitution Method.* Two methods may be used in this case, either point-by-point measurement or automatic measurement.

(a) *Point-by-Point Measurement.* The measurement of the free-field sound pressure level is made at the test point to be occupied subsequently by the hearing aid, note being made of the electrical input to the sound source required to provide the sound pressure levels desired for a particular test.

(b) *Automatic Measurement.* The measurement of the free-field sound pressure level is made at the test point to be occupied subsequently by the hearing aid, a continuous record of the sound pressure level versus frequency being recorded on an automatic level recorder.

(2) *Comparison Method.* The free-field sound pressure level at the test point is controlled using the special equipment of 3.6. This level is measured for

conformance to 3.3, by placing a calibrated microphone at the test point and recording the free-field sound pressure level with frequency, either point-by-point or with an automatic level recorder.

4.3 Locating the Hearing Aid for Test

4.3.1 ***Reference Point of the Hearing Aid.*** The reference point chosen for a particular hearing aid shall normally be the center of the microphone grille area, but where this is inappropriate (e.g., if there are two grille areas), a convenient reference point shall be used. The reference point shall be stated in the report.

The hearing aid shall be placed with the surface in which the reference point is located toward the sound source in such a way that the direction of the incident sound is perpendicular to the surface at the reference point.

In certain special types of instruments, it may be preferable to place the hearing aid with the surface in which the reference point is located in such a way that the direction of the incident sound is parallel to the surface at the reference point. When this is done, it shall be so stated.

When the substitution method is used, the reference point of the hearing aid shall coincide with the test point, i.e., the point where the pressure microphone used to calibrate the sound field was previously located. When the comparison method is used, the reference point of the hearing aid shall coincide with the test point, and the reference point of the monitoring microphone with another point chosen in accordance with 4.2.1.

4.3.2 ***Mechanical Support.*** Care should be taken that the mechanical support for the hearing aid does not appreciably disturb the sound field in the vicinity of the hearing aid at the test frequencies used, and it should not introduce spurious effects arising from mechanical resonance or mechanically transmitted vibrations.

4.3.3 ***Location in Free Field.*** The hearing aid shall be placed in the free field without any baffle or other device simulating the body or parts of the body of a wearer.

The coupler shall be so located as to minimize distortion of the sound field at the position of the hearing aid.

5. Test Procedure

5.1 Normal Operating Condition for the Hearing Aid. The normal hearing-aid conditions to apply for measurements when no other conditions are prescribed are:

(1) *Position of the Hearing Aid.* The hearing aid is located as described in 4.3 in accordance with the method of measurement used.

(2) *Power Supply.* The on-load voltages of all power supplies, measured across the hearing-aid terminals, shall be specified within 2 percent.

If a power supply other than the actual batteries recommended for the hearing aid is used, an examination shall be made to determine that equivalent results are obtained, both from the standpoint of internal battery impedance and acoustical effects.

(3) *Tone-Control Settings.* The settings selected for the tone control shall be stated in the report on test results. In general, the basic settings, i.e., those giving the broadest frequency range, shall be selected in preference to settings in which the low or high frequencies are attenuated. If, however, there are reasons for regarding some other settings as more representative of the normal use of the hearing aid, these settings may be adopted, provided they are clearly described in the report.

(4) *Gain Control.* The setting of the gain control shall be stated in each case.

(5) *Other Controls.* Settings that are deemed to be those most generally used with the particular hearing aid shall be chosen for all other controls, if any. The settings selected shall be stated in the report on test results.

(6) *Temperature.* When possible, the normal series of tests on the hearing aid shall be carried out at a temperature between 20 and 25 C. The actual temperature at the time of testing should be measured and stated in the report on the measurements.

5.2 Characteristic of the Gain Control (Optional). The purpose of this test is to determine the characteristic of the gain control. Although the procedure which follows is stated in acoustical terms, equivalent techniques involving purely electrical measurements are acceptable.

(1) Adjust the frequeney of the sound source to 1,000 cps and vary the setting of the gain control.

(2) The characteristic of the gain control shall be measured in the range where essentially linear input-output relations apply, i.e., a sufficiently low value of the free-field input sound pressure level shall be used.

(3) The acoustic gain is plotted as the difference in the output and input sound pressure levels versus the gain control setting, expressed as the percentage of the total movement.

5.3 Normal Method of Graphical Presentation of Frequency-Response Curves. A logarithmic scale for frequency, and a decibel scale for sound pressure amplification, etc, shall be used.

5.4 Effect of Tone-Control Positions on Frequency Response. The purpose of this test is to show the effect of tone-control positions on the frequency response of the hearing aid.

(1) The hearing-aid test conditions and volume-control setting are to remain identical with those in the basic frequency-response test and the coupler sound pressure level measured over the frequency range 200–5,000 cps for each additional tone-control position to be tested.

(2) The frequency response is plotted as the coupler sound pressure level versus frequency at constant free-field input sound pressure level with a curve for each tone-control position.

5.5 Basic and Comprehensive Frequency Response. A family of frequency-response curves is to be obtained with a series of input sound pressure levels in the range in which typical speech sounds lie. This family of curves will depict the comprehensive frequency response and will indicate the input-ouput characteristics of the hearing aid. A suitable one of these curves will be considered as the basic frequency response.

The test procedure is:

(1) Adjust the free-field sound pressure level to 60 db ± 1 db at 1,000 cps.

(2) Adjust the gain control to give a sound pressure level in the coupler of 100 db ± 2 db at 1,000 cps. If the hearing aid does not have sufficient gain to permit this adjustment, set the gain control at maximum. If the hearing aid has more minimum gain than will permit this adjustment, set the sound pressure level in the coupler to 110 db ± 2 db.

(3) Vary the frequency of the sound source over the frequency range of from 200 to 5,000 cps, keeping the free-field sound pressure level constant at 60 db, and measure the sound pressure levels in the coupler.

(4) For continuous recording, the sweep rate shall be such that the indication does not differ by more than 1 db from the steady-state value at any frequency.

(5) Repeat the procedure of (3) with free-field sound pressure levels of 50, 70, and 80 db, or with such other input sound pressure levels as will adequately show the behavior of the hearing aid at various input levels.

(6) The frequency response is plotted as the coupler sound pressure level versus frequency at constant free-field input sound pressure level, with a curve for each of the input sound pressure levels used. The curves will thus be parallel curves with a distance of 10 db between neighboring curves in the range where essentially linear input-output relations apply.

(7) The response curve obtained under the above conditions, and with an input sound pressure level of 60 db, is to be considered as the basic frequency response.

NOTE: In certain cases, e.g., if a serious degree of overloading should occur, it may be necessary to adopt a lower input sound pressure level or a lower position of the gain control to define the basic frequency response. When these measures are taken, the test conditions shall be stated.

5.6 Saturation Sound Pressure Level in the Coupler. The purpose of this test is to determine the maximum rms coupler sound pressure level that the hearing aid is capable of producing with gain control at maximum, using as much input sound pressure level as is needed to produce maximum output at each test frequency.

NOTE: This test gives information which is of great value when considering whether the maximum intensities available from the hearing aid may be dangerous to the ear.

It should be noted that the sound pressure in the coupler is usually far from being undistorted; for further information, see 5.9.

The test procedure is:

(1) Turn the gain control full-on.

(2) At a given frequency, increase the free-field sound pressure level until a maximum value of the rms coupler sound pressure is obtained, and record the coupler sound pressure level.

NOTE: For many hearing aids, the coupler sound pressure rises to a maximum at some frequencies as the sound pressure input to the hearing aid is increased, and then falls with a further increase of input sound pressure. Measurement of the saturation output using a constant high-input sound pressure level may, therefore, lead to incorrect results.

(3) Repeat the procedure of (2) at a sufficient number of frequencies to define the shape of the curve showing the saturation sound pressure level in the coupler within the frequency range 200–5,000 cps.

The test procedure given above is particularly adapted to point-by-point measurement. If other methods are used, it is important that the possible error referred to in the note to (2) should be avoided in order to be sure that the results conform with those obtained using the above method.

5.7 Full-on Acoustic Gain (Acoustic Gain at Maximum Gain-Control Setting)

The test procedure is:

(1) Turn the gain control full-on.

(2) Adjust the free-field input sound pressure level to 50 db.

(3) Measure the sound pressure levels in the coupler, covering the range 200–5,000 cps.

(4) Plot the acoustic gain as the difference between the output and input sound pressure levels versus frequency.

5.8 Power-Supply Voltage Variation (Optional). The purpose of this test is to determine the effect of power-supply voltage variation on the acoustic gain. Although the procedure which follows is stated in acoustical terms, equivalent electrical measurements are acceptable. A recommended procedure is:

(1) Adjust the free-field sound pressure level to 60 db at 1,000 cps.

(2) Place the hearing aid in the sound field and adjust gain control in accordance with 5.5 (2).

(3) Record the sound pressure levels in the coupler for various supply voltage values from rated voltage to 67 percent of rated voltage, measured under load.

(4) Using rectangular co-ordinate paper, plot the deviation of acoustic gain from gain at rated supply voltage as a function of supply voltage. A reading of 20 db on the gain scale shall correspond approximately to the total voltage variation on the voltage scale.

NOTE: There may be occasions when it is also desirable to measure acoustic gain at maximum volume-control setting or saturation sound pressure level as a function of power-supply voltage.

5.9 Harmonic Distortion. The purpose of this test is to determine the degree of harmonic distortion in the sound output under specified conditions of excitation.

The test procedure, to be carried out at 500, 700, and 900 cps, is:

(1) Adjust the free-field sound pressure level to 75 db.

(2) Adjust the gain control of the hearing aid so that the total sound pressure level in the coupler is approximately 80 db (or some higher level if this is not possible) and measure the harmonic distortion.

(3) Advance the gain control and measure the harmonic distortion at a sufficient number of coupler sound pressure levels, including the maximum available, to define the curve of harmonic distortion versus coupler sound pressure level.

(4) The percentage total harmonic distortion shall be considered as:

$$100\sqrt{\frac{p_2^2 + p_3^2 + p_4^2 + \cdots\cdots\cdots\cdots}{p_1^2 + p_2^2 + p_3^2 + p_4^2 \cdots\cdots\cdots\cdots}}$$

where p_1 is the amplitude of the sound pressure at the fundamental frequency in the coupler, and p_2, p_3, p_4, etc, are the amplitudes of the sound pressures at the harmonic frequencies.

NOTE 1: When appropriate, the lowest value of the sound pressure level in the coupler at which the total harmonic distortion reaches 10 percent is designated as the rated sound pressure level. In certain cases, for instance with Class B amplification, this concept may not be appropriate.

NOTE 2: It may sometimes be preferable to state the sound pressure levels of the individual harmonics rather than the total harmonic distortion.

5.10 Battery Current. The purpose of this test is to determine the battery current.

(1) If a battery current is dependent on gain control setting, or if it is significantly affected by the signal, the hearing aid shall be operated as described in 5.5 (1) and (2).

(2) Battery current measurements shall be made with instruments whose errors do not exceed 2 percent at the parts of the scale used for the measurement.

6. Revision of American Standards Referred to in This Document

When the following American Standards referred to in this document are superseded by a revision approved by the American Standards Association, Incorporated, the revision shall apply:

American Standard Method for the Pressure Calibration of Laboratory Standard Pressure Microphones, Z24.4-1949

American Standard Specification for Laboratory Standard Pressure Microphones, Z24.8-1949

Appendix

(This Appendix is not a part of American Standard Methods for Measurement of Electroacoustical Characteristics of Hearing Aids, S3.3-1960, but is included to facilitate its use.)

There are a number of other characteristics of hearing aids which are not dealt with in the foregoing standard, since there is not yet general agreement on measurement procedures. These characteristics include:

(1) The characteristics of automatic gain control and peak clipping circuits

(2) Frictional noise produced by contact with the case or connecting leads of the hearing aid

(3) Noise produced by magnetic and electric induction

(4) Intermodulation distortion characteristics

(5) Frequency response and sensitivity of a hearing aid using pickup coil

(6) Gain, response, etc, when using a bone-conduction receiver

(7) Noise generated in the hearing aid other than externally induced noise

Related American Standards

In addition to this standard, there are available the following approved American Standards in the field of Acoustics, Vibration, Mechanical Shock, and Sound Recording:

S1.1-1960	Acoustical Terminology (Including Mechanical Shock and Vibration)	$4.50
S1.6-1960	Preferred Frequencies for Acoustical Measurements	.35
S2.2-1959	Calibration of Shock and Vibration Pickups, Methods for	2.50
S2.4-1960	Auxiliary Equipment for Shock and Vibration Measurements, Method for Specifying the Characteristics of	.80
S3.1-1960	Criteria for Background Noise in Audiometer Rooms	1.00
S3.2-1960	Monosyllabic Word Intelligibility, Method for Measurement of	1.35
S4.1-1960	Mechanically Recorded Lateral Frequency Records, Methods of Calibration of	.60
Z24.3-1944	Sound Level Meters for Measurement of Noise and Other Sounds	.50
Z24.4-1949	Pressure Calibration of Laboratory Standard Pressure Microphones, Method for the	1.35
Z24.5-1951	Audiometers for General Diagnostic Purposes	.80
Z24.7-1950	Apparatus Noise Measurement, Test Code for	.80
Z24.8-1949	Laboratory Standard Pressure Microphones, Specification for	.80
Z24.9-1949	Coupler Calibration of Earphones, Method for the	.75
Z24.10-1953	Octave-Band Filter Set for the Analysis of Noise and Other Sounds, Specification for an	.50
Z24.11-1954	Free-Field Secondary Calibration of Microphones, Method for the	.50
Z24.12-1952	Pure-Tone Audiometers for Screening Purposes, Specification for	.50
Z24.13-1953	Speech Audiometers, Specification for	.50
Z24.14-1953	Measurement of Characteristics of Hearing Aids, Method for	.50
Z24.15-1955	Specifying the Characteristics of Analyzers Used for the Analysis of Sounds and Vibrations, Method for	.50
Z24.17-1955	Design, Construction, and Operation of Class HI (High-Inpact) Shock-Testing Machine for Lightweight Equipment, Specification for the	1.00
Z24.18-1956	Ultrasonic Therapeutic Equipment, Specification for	.75
Z24.19-1957	Laboratory Measurement of Air-Borne Sound Transmission Loss of Building Floors and Walls, Recommended Practice for	.50
Z24.21-1957	Specifying the Characteristics of Pickups for Shock and Vibration Measurement, Method for	1.00
Z24.22-1957	Measurement of the Real-Ear Attenuation of Ear Protectors at Threshold, Method for the	.50
Z24.24-1957	Calibration of Electroacoustic Transducers (Particularly Those for Use in Water), Procedures for	2.00
Z57.1-1954	Flutter Content of Sound Recorders and Reproducers, Method for Determining	.75
Z57.4-1959	Magnetic Recording Instruments for the Home—Wire Size, Speed, Spools, Requirements for (EIA REC-131-A)	.35
Y10.11-1953 (R 1959)	Letter Symbols for Acoustics	1.00

NOTE: Special price of series may be obtained upon request.

The Relations of Hearing Loss to Noise Exposure, Z24-X-2, a report on the research findings of Exploratory Subcommittee Z24-X-2 of the American Standards Association, is also available at $1.50. The purpose of this subcommittee was to explore the possibility of establishing bio- and psychoacoustic criteria for noise control, particularly in the area of industrial noise exposure. Their hope was to bring the results to the attention of the groups concerned with the problems of industrial noise, and they also hope that the approach outlined in it will be tested in industry. However, this report is not an approved American Standard and proposes neither standards nor criteria.

For a free and complete list of the available American Standards or information about membership in the ASA write:

AMERICAN STANDARDS ASSOCIATION

INCORPORATED

10 EAST 40TH STREET NEW YORK 16, N. Y.

APPENDIX IV

A SUGGESTED TRAINING PROGRAMME FOR A CLINICAL AUDIOLOGIST

BY: JOHN BOYD, Ph.D.
Special Services Branch,
Ontario Department of Education.

Audiology is the science of hearing. A programme to train a clinical audiologist should enable a person to work in either: (a) a hospital clinic dealing with children and/or adults, or (b) a school situation such as a Speech and Hearing Clinic operated by a Board of Education, Public Health Unit or a School for the Deaf. A clinical audiologist is required to work either alone or in co-operation with other professions. This necessitates that he be a mature person with a broad background in the humanities and/or science.

The following areas are deemed to be essential to enable the clinical audiologist to function at an appropriate professional level.

ACOUSTICS

A basic course dealing with the nature of sound, its parameters, frequency and intensity and their measurement; the decibel scale and the relationship between sound pressure levels, sensation levels and the acoustics of speech.

ANATOMY, PHYSIOLOGY AND NEUROPHYSIOLOGY OF THE AUDITORY MECHANISM

The structure of the human ear; the function and neural connections should be thoroughly studied; a review of the history and the currently accepted theories of hearing. Actual dissection is not necessary. It is also desirable to include a course in the anatomy and physiology of the speech mechanism, although again no dissection is necessary.

DISORDERS OF HEARING

A thorough study of the peripheral and central disorders which result in a loss of hearing. The audiologist should be acquainted with modern medical and surgical techniques and management of hearing disorders. Observations of these procedures to familiarize the student with current developments would be desirable.

ROUTINE AUDIOLOGICAL ASSESSMENT

A study of the types of hearing impairments as revealed by pure tone air and bone conduction audiometry; the use of the narrow band masking. The use of speech audiometry to assess the usefulness of residual hearing. The interpretation and management of cases in view of the implications of the hearing loss on communication is essential for appropriate ameliorative action. A knowledge of the organization and administration of hearing-conservation programmes is useful.

ADVANCED CLINICAL PROCEDURES

A study of special auditory testing techniques useful in differentiating conductive, sensory-neural, VIIIth nerve and higher auditory lesions and pseudohypoacousis. This includes advanced pure tone audiometry and speech audiometry, the physical requirements and instrumentation; the interpretation of test results with special emphasis on medical implications and communication problems.

HEARING AIDS

A study of the construction and function of hearing aids through actual examination of the instruments. Study and experience in the selection of hearing aids; types of aids and problems of adjustment to amplification are necessary. Some knowledge of the hearing aid industry and merchandizing policies to ensure good relationships is desirable. Clinical practice is necessary.

PAEDO-AUDIOLOGY

Special techniques used in the evaluation of neonates, infants and pre-school children. Remedial programmes, parent counselling, selection of hearing aids and knowledge of educational facilities are necessary. Actual clinical practice is required.

HABILITATION AND REHABILITATION FOR THE HEARING IMPAIRED

A study of the methods of auditory training to assist in adjustment to amplification and speech discrimination. Methods for teaching speech reading appropriate for children and adults. Observation and practice are necessary.

CHILD PSYCHOLOGY

The student should have a working knowledge of normal child psychology with emphasis on speech, language and auditory development.

PSYCHOLOGY OF DEAFNESS

A consideration of the impact of deafness on pre-school, school age children as well as adults; a study of the effect of a hearing loss on the areas of intelligence, special maturity, personality, language, motor development, education and vocation.

STATISTICS AND EXPERIMENTAL DESIGN

A knowledge of statistics and experimental design is necessary to keep abreast of new research.

RELATED AREAS

Special training in interview and history taking techniques are desirable. Some knowledge of other handicaps, mental retardation, aphasia, emotional disorders and speech problems will be of considerable value. Some consideration should be given to industrial audiology, including evaluation and control of industrial noise.

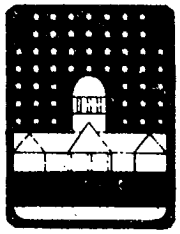
Prevention of industrial hearing losses and the medico-legal criteria and implications of a hearing loss are useful.

The total number of hours involved is uncertain, but each designated area could have 40 hours of lectures or more. Clinical observation and practice is essential. These should be about 200 hours. Time will also need to be allocated for reading. No consideration is given as to whether this idealistic programme would take one or more years, or whether it would be at a master's or doctoral degree level. Provision and flexibility should be permitted so that a student could specialize in an area. The above outline is presented simply as a programme that experience has dictated as necessary ingredients to produce a competent clinical audiologist.

"The writer is indebted to Dr. C. R. Harford, Associate Professor of Audiology, North Western University for valuable suggestions"

APPENDIX V

SELLING AND FITTING OF HEARING AIDS



Reprinted from

SUGGESTED STATE LEGISLATION — Volume XXVI — 1967

Developed by

COMMITTEE OF STATE OFFICIALS ON SUGGESTED STATE LEGISLATION

of

THE COUNCIL OF STATE GOVERNMENTS

1313 EAST SIXTIETH STREET

CHICAGO 37, ILLINOIS

SELLING AND FITTING OF HEARING AIDS

Hearing aids are generally sold, fitted and advertised in ordinary stores and through the use of ordinary commercial channels. Nevertheless, they are paramedical instruments designed to compensate for a significant physical loss or impairment. Consequently, judgment concerning the circumstances appropriate for their use, the type of instrument that best meets the needs of the customer, and their repair or replacement merit some degree of expertness, beyond that which may be presumed to be possessed by the ordinary store clerk. Indeed, the less legitimate dealers in hearing aids have been known to represent directly, or purposely to convey the impression, that they or their employees have medical capabilities and that they have special qualifications in the field of diagnosis and prescription relating to hearing. Consequently, indicated legislative approaches to this problem consist only in part of the application or extension of unfair competition and misrepresentation statutes. Some effort to assure the competence and integrity of dealers and sales personnel is desirable. In the hearing aid industry, as presently structured, this is a particularly important phase of the problem. Many hearing aids are not sold directly to the public through the manufacturer's own outlets. Accordingly, it is inevitable that the independent retailer or persons under his control be the ones to see the customers and advise them concerning both their paramedical needs and the qualities of the hearing equipment. This means that such manufacturers' warrantees or guarantees as may accompany the hearing aids cannot apply to the often crucial question of whether the particular device is suitable for the particular hearing impairment from which the individual customer suffers. The Federal Trade Commission has issued rules of fair practice applicable to the advertising and selling of hearing aids but the Federal Trade Commission can reach only activities in interstate commerce. For the reasons just outlined, this leaves an important phase of the business uncovered.

The suggested legislation follows the provisions of an Oregon statute very closely. (Oregon Revised Statutes, Title 52, Chapter 694, added by Laws of 1959 c. 634, Sections 1-26, as amended).

Suggested Legislation

[Title should conform to state requirements. The follow-

ing is a suggestion: "An Act providing for the certification of dealers and persons engaged in the fitting of hearing aids, and for related purposes."]

(Be it enacted, etc.)

Section 1. Definitions.

As used in this Act, unless the context otherwise requires:

(1) ["Appropriate state agency"] means the State [Board or Department of Health].

(2) "Certificate of registration" includes a temporary certificate of registration.

(3) "Council" means the Advisory Council to the [appropriate state agency] on Hearing Aids.

(4) "Hearing aid" means any instrument or device designed for or represented as aiding, improving or correcting defective human hearing and any parts, attachments or accessories of such an instrument or device.

(5) "Practice of fitting hearing aids" means the evaluation or measurement of the powers or range of human hearing by means of an audiometer or by any other means devised and the consequent selection or adaptation or sale of hearing aids intended to compensate for hearing loss.

(6) "Unethical conduct" means:

(a) The obtaining of any fee or the making of any sale by fraud or misrepresentation.

(b) Employing directly or indirectly any suspended or unregistered person to perform any work covered by this Act.

(c) Using or causing or promoting the use of any advertising matter, promotional literature, testimonial, guarantee, warranty, label, brand, insignia or any other representation, however disseminated or published, which is misleading, deceiving, improbable or untruthful.

(d) Advertising a particular model, type or kind of hearing aid for sale when purchasers or prospective purchasers responding to the advertisement cannot purchase or are dissuaded from purchasing the advertised model, type or kind where it is established that the purpose of the advertisement is to obtain prospects for the sale of a different model, type or kind than that advertised.

(e) Representing that the services or advice of a person licensed to practice medicine will be used or made available in

the selection, fitting, adjustment, maintenance or repair of hearing aids when that is not true, or using the word "doctor", "clinic" or other like words, abbreviations or symbols which tend to connote the medical profession when such use is not accurate.

(f) Habitual intemperance.

(g) Gross immorality.

(h) Permitting another to use his certificate.

Section 2. Certificate of Registration Required; Posting.

No person shall engage in the sale of or practice of fitting hearing aids or display a sign or in any other way advertise or hold himself out as a person who practices the fitting of hearing aids unless he holds a current, unsuspended, unrevoked certificate of registration issued by the [appropriate state agency] as provided in this Act, or unless he holds a current, unsuspended, unrevoked certificate of endorsement pursuant to Section 8 (b) of this Act. The certificate required by this Section shall be kept conspicuously posted in his office or place of business at all times.

Section 3. Receipts.

Any person who practices the fitting of or dealing in hearing aids shall deliver to each person supplied with a hearing aid, by him or at his order or direction, a receipt which shall contain his signature and show the address of his regular place of practice and the number of his certificate, together with a specification of the hearing aid furnished and the amount charged therefor.

Section 4. Persons and Practices Not Affected.

(a) This Act does not apply to a person while he is engaged in the practice of fitting hearing aids if his practice is part of the academic curriculum of an accredited institution of higher education or part of a program conducted by a public, charitable institution or nonprofit organization, which is primarily supported by voluntary contributions.

(b) This Act shall not be construed to prevent any person who is a medical or ostepathic physician licensed to practice by the [state medical licensing agency] from treating or fitting hearing

aids to the human ear.

Section 5. Qualifications of Applicants for Registration; Fee.

An applicant for registration shall pay a fee of [$50] and shall show to the satisfaction of the [appropriate state agency] that he

(1) Is a resident of this State.

(2) Is a person of good moral character.

(3) Is 21 years of age or older.

(4) Has an education equivalent to a four-year course in a standard high school or has continuously engaged in the practice of fitting hearing aids in this State during the three years preceding the effective date of this Act.

(5) Is free of contagious or infectious disease.

Section 6. Examination.

(a) An applicant for registration who is notified by the [appropriate state agency] that he has fulfilled the requirements of Section 5 shall appear at a time, place and before such persons as the [appropriate state agency] may designate, to be examined by written and practical tests in order to demonstrate that he is qualified to practice the fitting of hearing aids.

(b) The [appropriate state agency] shall give at least one examination of the type prescribed in subsection (a) of this Section in each year, and such additional examinations as the volume of applications may make appropriate.

Section 7. Scope of Examination.

The examination provided in subsection (a) of Section 6 shall consist of:

(1) Tests of knowledge in the following areas as they pertain to the fitting of hearing aids.

(i) Basic physics of sound.

(ii) The human hearing mechanism, including the science of hearing and the causes and rehabilitation of abnormal hearing and hearing disorders.

(iii) Structure and function of hearing aids.

(2) Tests of proficiency in the following techniques as they pertain to the fitting of hearing aids.

(i) Pure tone audiometry, including air conduction testing and bone conduction testing.

(ii) Live voice or recorded voice speech audiometry, including speech reception threshold testing and speech discrimination testing.

(iii) Effective masking.

(iv) Recording and evaluation of audiograms and speech audiometry to determine hearing aid candidacy.

(v) Selection and adaptation of hearing aids and testing of hearing aids.

(vi) Taking earmold impressions.

Section 8. Registration and Issuance of Certificates; Fees.

(a) Upon payment of [$20], the [appropriate state agency] shall register each applicant who satisfactorily passes the examination. Thereupon the [appropriate state agency] shall issue to the applicant a certificate of registration. The certificate of registration shall be effective for one year.

(b) Whenever the [appropriate state agency] determines that another state or jurisdiction has requirements equivalent to or higher than those in effect pursuant to this Act for the selling and the practice of fitting hearing aids, and that such state or jurisdiction has a program equivalent to or stricter than the program for determining whether applicants pursuant to this Act are qualified to sell and fit hearing aids, the [appropriate state agency] may issue certificates of endorsement to applicants therefor who hold current, unsuspended and unrevoked certificates or licenses to sell and fit hearing aids in such other state or jurisdiction. No such applicant for a certificate of endorsement pursuant to this subsection shall be required to submit to or undergo any examination, investigation or other procedure, other than the payment of fees, pursuant to Sections 5, 6 and 7 of this Act. The holder of a certificate of endorsement shall be registered in the same manner as holders of certificates of registration. The fee for an initial certificate of endorsement shall be the same as the fee for an initial certificate of registration. Fees, grounds and procedures for renewal, suspension and revocation of certificates of endorsement shall be the same as for renewal, suspension and revocation of certificates of registration.

Section 9. Temporary Certificate of Registration.

(a) An applicant who fulfills the requirements of Section 5 and who has not previously applied to take the examination provided under subsection (a) of Section 6 may apply to the [appropriate state agency] for a temporary certificate of registration.

(b) Upon receiving an application provided under subsection (a) of this Section accompanied by a fee of [$5], the [appropriate state agency] shall issue a temporary certificate of registration which shall entitle the applicant to practice the fitting of hearing aids for a period ending [ten days] after the conclusion of the next examination given after the date of issue.

(c) No temporary certificate of registration shall be issued by the [appropriate state agency] under this Section unless the applicant shows to the satisfaction of the [appropriate state agency] that he is or will be employed, supervised and trained by a person who holds a valid certificate of registration or certificate of endorsement issued under this Act.

(d) If a person who holds a temporary certificate of registration issued under this Section does not take the next examination given after the date of issue, the temporary certificate shall not be renewed.

(e) If a person who holds a temporary certificate of registration issued under this Section takes and fails to pass the next examination given after the date of issue, the [appropriate state agency] may renew the temporary certificate of registration for a period ending [ten days] after the conclusion of the next examination given after the date of the renewal. Two renewals may be allowed, but in any event the time for which an individual may hold a temporary certificate of registration shall not exceed sixteen months. The fee for a renewal shall be [$20].

Section 10. Notice.

(1) A person who holds a certificate of registration or a certificate of endorsement shall notify the [appropriate state agency] in writing of the address of the place or places where he engages or intends to engage in the practice of fitting or sale of hearing aids.

(2) The [appropriate state agency] shall keep a record of the places of practice of persons who hold certificates of registration or certificates of endorsement.

(3) Any notice required to be given by the [appropriate state agency] to a person who holds a certificate of registration or certificate of endorsement may be given by mailing it to him at the address of the last place of practice of which he has notified the [appropriate state agency].

Section 11. Renewal.

A person who practices the fitting of hearing aids shall annually pay to the [appropriate state agency] a fee of [$40] for a renewal of his certificate of registration or certificate of endorsement. A thirty-day grace period shall be allowed after expiration of a certificate during which a certificate may be renewed on payment of a fee of [$45] to the [appropriate state agency]. The [appropriate state agency] may suspend the certificate of any person who fails to renew his certificate before the expiration of the thirty-day grace period. After the expiration of the grace period, the [appropriate state agency] may renew such a certificate upon the payment of [$50] to the [appropriate state agency]. No person who applies for renewal, whose certificate was suspended for failure to renew shall be required to submit to any examination as a condition of renewal.

Section 12. Grounds for Suspension or Revocation of Certificates.

Any person registered under this Act may have his certificate revoked or suspended for a fixed period by the [appropriate state agency] for any of the following causes:

(1) His conviction of an offense involving moral turpitude. The record of conviction, or a certified copy thereof certified by the clerk of the court or by the judge in whose court the conviction is had, shall be conclusive evidence of such conviction.

(2) When his certificate has been secured by fraud or deceit practiced upon the [appropriate state agency].

(3) For unethical conduct, or for gross ignorance or inefficiency in his profession.

(4) Practicing while knowingly suffering from a contagious or infectious disease.

(5) Advertising professional methods or professional superiority.

(6) Practicing the fitting of hearing aids under a false or alias name.

(7) For any violation of the provisions of this Act.

Section 13. Prohibited Acts and Practices.

No person may:

(1) Sell, barter or offer to sell or barter a certificate of registration.

(2) Purchase or procure by barter a certificate of registration with intent to use it as evidence of the holder's qualification to practice the fitting of hearing aids.

(3) Alter materially a certificate of registration with fraudulent intent.

(4) Use or attempt to use as a valid certificate of registration a certificate which has been purchased, fraudulently obtained, counterfeited or materially altered.

(5) Willfully make a false, material statement in an application for registration or for renewal of a certificate of registration.

Section 14. Powers and Duties of [appropriate state agency].

The powers and duties of the [appropriate state agency] are as follows:

(1) To authorize all disbursements necessary to carry out the provisions of this Act.

(2) To supervise and administer qualifying examinations to test the knowledge and proficiency of applicants for registration.

(3) To register persons who apply to the [appropriate state agency] and who are qualified to practice the fitting of hearing aids.

(4) To purchase and maintain or rent audiometric equipment and facilities necessary to carry out the examination of applicants for registration.

(5) To issue and renew certificates of registration and certificates of endorsement.

(6) To suspend or revoke certificates of registration and certificates of endorsement pursuant to this Act.

(7) To appoint representatives to conduct or supervise the examination of applicants for registration.

(8) To designate the time and place for examining applicants for certificates of registration.

(9) To make and publish rules and regulations not inconsistent

with the laws of this State which are necessary to carry out the provisions of this Act.

(10) To require the periodic inspection of audiometric testing equipment and to carry out the periodic inspection of facilities of persons who practice the fitting of hearing aids.

Section 15. Advisory Council on Hearing Aids.

(a) There hereby is created the Advisory Council on Hearing Aids. The council shall consist of five members to be appointed by the Governor [with the advice and consent of the Senate]. The Governor shall designate one member as chairman.

(b) Members of the council shall be residents of this State. One member shall be a person licensed to practice medicine in this State who holds a certificate of qualification from the American Board of Otolaryngology. [One member shall have at least four years of paid work experience in audiology, shall hold a certificate of clinical competence in audiology from the American Speech and Hearing Association and shall be a member in good standing of that association.] Three members shall be persons experienced in the fitting of hearing aids, who possess the qualifications provided in Section 5; but all successors to the position of such members, who are appointed to the council after the date on which the [appropriate state agency] first issues a certificate of registration as provided in Section 8, shall be persons who hold valid certificates of registration under this Act. No member of the council shall be a member or employee of the [appropriate state agency].

(c) [Use this subsection to provide for terms of office of council members, filling of vacancies, and any other necessary detail. There may be advantage in a staggered term arrangement for members of the council in order to provide continuity.]

Section 16. Duties of Council.

(a) The council shall have the responsibility and duty of advising the [appropriate state agency] in all matters relating to this Act, shall prepare the examinations required by this Act subject to the approval of the [appropriate state agency] and shall assist the [appropriate state agency] in carrying out the provisions of this Act.

(b) The [appropriate state agency] shall consider and be guided by the recommendations of the council in all matters

relating to this Act.

Section 17. Meetings of Council.

The council shall meet at least once each year at a place and time determined by the council. The council shall also meet at such other times and places as are specified by the [appropriate state agency].

Section 18. Disposition of Receipts.

[Provisions should be made for the crediting of receipts from fees charged for applications and renewals. It may be desirable to make such money available for administration of the Act.]

Section 19. Penalties and Remedies.

(a) Violation of any provision of this Act is a misdemeanor punishable, upon conviction, by a fine of not more than [$500] or by imprisonment for not more than [ninety days], or both.

(b) The [appropriate state agency] may enforce any provision of this Act by injunction or by any other appropriate proceeding. No such proceeding shall be barred by any proceeding had or pending pursuant to subsection 1 of this Section or by the imposition of any fine or term of imprisonment pursuant thereto.

Section 20. Hearings and Judicial Review.

(a) No certificate pursuant to this Act may be suspended, revoked, denied or renewal denied without a hearing, if requested by the certificate holder or applicant, on due notice.

(b) Any action of the [appropriate state agency] taken pursuant to or under color of this Act shall be reviewable as provided in the [state administrative procedure act]. [If there is no state administrative procedure act, or if a special review procedure is desired, make appropriate provisions.]

Section 21. Effective Date.

[Insert effective date.]

APPENDIX VI

DEPARTMENT OF CONSUMER AND CORPORATE AFFAIRS

TRADE PRACTICES

FOR

THE HEARING AID INDUSTRY

The Department of Consumer and Corporate Affairs has established a number of "DO'S" and "DON'TS" for manufacturers, distributors and dealers in hearing aids to prevent and eliminate various practices which are detrimental to consumers. The industry members for whom these rules are set out are those individuals, firms, corporations and organizations engaged in the manufacture, distribution or sale of instruments or devices designed for or represented as aiding, improving or correcting defective hearing and parts and accessories for such instruments or devices and described in the practices as the "product" or "products" of the industry.

Practices similar to those which are condemned by this code are prohibited by law. Other practices condemned by the code have no sanction except the condemnation of those people and groups interested in protecting the public.

1. No industry member shall make or cause to be made, directly or indirectly, for the purpose of promoting the sale or use of a product, any materially misleading representation to the public, by any means whatever, concerning:

(a) the grade, quality, quantity, origin, novelty, price, cost, terms of sale, use, construction, size, composition, dimensions, type, design, development, visibility, durability, performance, fit, appearance, efficacy, benefits, cost of operation, resistance to climatic conditions, or physiological benefits of any product, or the psychological well-being induced by a product; or

(b) any service or adjustment offered, promised, or to be supplied to purchasers of any product; or

(c) the manufacture, distribution, or marketing of any product; or

(d) the scientific or technical knowledge, training, experience, or other qualifications of any industry member, or of any of his employees, relating to the selection, fitting, adjustment, maintenance, or repair of industry products; or

(e) any other matter.

2. A seller of hearing aids shall not offer for sale any product when the purpose of offering the product is not to sell it at a profit but to attract customers in the hope of selling them other articles.

Among practices which are condemned are:

(a) Through the initial offer or advertisement, creating a materially false impression of the product offered;

(b) Refusing to show, demonstrate, or sell the product offered in accordance with the terms of the offer;

(c) Disparaging by acts or words the product offered, or the guarantee, credit terms, availability of service, repairs or parts, or in any other way, in connection with it;

(d) Showing, demonstrating and, in the event of sale, the delivery of a product which is unusable or impractical for the purpose represented or implied in the offer;

(e) Refusing, in the event of a sale of the product offered, to deliver such product to the buyer within a reasonable time;

(f) Failing to have available a quantity of the advertised product at the advertised price sufficient to meet reasonably anticipated demands.

3. No industry member shall offer, by any means whatever, to promote the sale or use of a hearing aid or device, a refund on a hearing aid or device.

(a) unless the offer is a bona fide offer of a refund; and

(b) unless the terms of the refund are set out in writing; and

(c) unless the refund may be obtained when the unsatisfactory hearing aid is returned to the industry member or his agent by registered mail.

4. (a) Where a guarantee or warranty is offered either in writing or verbally, it shall clearly disclose:

(i) the nature and extent of the guarantee or warranty, and

(ii) any material conditions or limitations in the guarantee or warrantee which are imposed by the guarantor or warrantor,

(iii) the manner in which the guarantor, or warrantor will perform under the guarantee or warranty, and

(iv) the name and address of the guarantor or warrantor.

(b) Guarantees for "life" or a "lifetime" shall disclose clearly the meaning of "life" or "lifetime" as used, that is, whether that of the purchaser, the product or otherwise.

(c) Guarantees shall not be used which under normal conditions are:

(i) impractical of fulfillment; or

(ii) for such a period of time or otherwise of such nature as to have the capacity and tendency of misleading the public concerning the serviceability, durability or performance capability of the hearing aid.

(d) Where a statement or guarantee of performance, efficacy or length of life is made to promote the sale of the product, it shall be based on an adequate and proper test of the product.

5. In the sale, distribution, or promotion of hearing aids or devices, no industry member shall:

(a) represent in any way that a hearing aid or device has been tested, accepted, or approved by an individual, concern, organization, group, or association, unless such is the fact and unless the hearing aid or device has been tested by such individual, concern, organization, group,

or association in such manner as reasonably to insure the quality and performance of the instrument in relation to its intended usage and the fulfillment of any material claims made, implied, or intended to be supported by such representation or insignia; or

(b) represent that a hearing aid or device tested, accepted, or approved by any individual, concern, organization, group, or association has been subjected to tests based on more sever standards of performance, workmanship, and quality than is in fact true; or

(c) make any other false, misleading or deceptive representation respecting the testing, acceptance, or approval of a hearing aid or device by any individual, concern, organization, group, or association.

6. No industry member shall:

(a) represent directly or by implication through the use of such words or expressions as "invisible", "hidden", "hidden hearing", "completely out of sight", "conceal your deafness", "hear in secret", "unnoticed even by your closest friends", "no one will know you are hard of hearing", "your hearing loss is your secret", "no one need

know you are wearing a hearing aid", "hidden or out of sight when inserted in the ear canal", or by any other statements of similar import, that any hearing aid, device, or part is hidden or cannot be seen unless such is the fact.

(b) use the words or expressions, "no cord", "cordless" "100% cordless", "no unsightly cord dangling from your ear", "no wires", "no tell-tale wires", or other similar words or expressions, unless such representations are true and unless a clear and adequate disclosure is made that a plastic tube runs from the instrument to the ear, if such is the fact.

(c) use the words or expressions, "no button", "no ear button", "no buttons or receivers in either ear", or other similar words or expressions, unless such representations are true and unless a clear and adequate disclosure is made that an ear mold or plastic tip is inserted in the ear, if such is the fact.

(d) represent directly or by implication that a hearing aid utilizing bone conduction has certain specified features such as the absence of anything in the ear, or leading to the ear, or the like, without disclosing clearly and conspicuously that the instrument operates on the bone-conduction principle and that in many cases of hearing loss this type of instrument may not be suitable.

7. No industry member shall use any advertisement or other representation which has the capacity, tendency or effect of misleading the public into the belief that any hearing aid or device or part or accessory thereof is a new invention or involves a new mechanical or scientific principle, when such is not the fact. Examples of such representations, when not fully justified by the facts, are "amazing new discovery", "revolutionary new invention", "radically new and different", "sensational new laboratory development", "remarkable new electronic device", "brand new invention", "marvelous new hearing invention", "new scientific aid", and "miracle".

8. No industry member shall use or cause to be used any type of advertising or promotional literature depicting or describing only a single part, accessory, or component of any hearing aid or device, such as a battery on the finger, a transistor held in the hand, etc., in such manner as to have the capacity and tendency to mislead or deceive the public into the erroneous belief that the said part, accessory, or component is all that needs to be worn or carried.

9. No industry member shall represent directly or by implication that batteries sold only by such industry member or other specified person or concern, or bearing a specified brand, label, or other identifying mark, are the only ones suitable for use in a particular type or make of hearing aid or device when such is not the fact.

10 (a) No industry member shall represent directly or indirectly that any industry product or part thereof is new, unused, or rebuilt, when such is not the fact.

(b) In the marketing of an industry product which has been used, or which contains used parts, an industry member shall make fully and without deception disclosure of such fact in all advertising and promotional literature relating to the product, on the container, box, or package in which such product is packed or enclosed and, if the product has the appearance of being new, on the product itself. Such disclosure may be made by use of words such as "Used", "Secondhand", "Repaired", or "Rebuilt", whichever is applicable to the product involved.

(c) The rebuilder of the product should be disclosed.

11. No representations shall be made directly or indirectly that a product offers a cure for a hearing loss either on a temporary or permanent basis.

12. (a) In connection with the sale or offering for sale of industry products, no industry member shall represent directly or by implication that the services or advice of a physician or audiologist have been used or made available in the selection, fitting, adjustment, or testing of industry products relative to the individual needs of consumer-purchasers, when such is not the fact. This applies to the use of the terms "doctor", "physician",

"otologist", or "otolaryngologist", to any abbreviations, variations, or derivatives of such terms, and to the use of any symbol, depiction, or representation having a medical connotation.

(b) No industry member shall use in advertising or otherwise the words "prescribe" or "prescription", or any abbreviation, variation, derivative or symbol in referring to or describing any industry product, unless such product was made pursuant to a prescription given by a physician.

(c) No representation shall be made which distorts the true meaning of statements made by professionals or scientific authorities.

13. No industry member shall represent directly or by implication that a commercial hearing aid establishment is a governmental or public one, or is a nonprofit medical, educational, or research institution, through the use of terms having a medical, professional, or scientific connotation, such as, "Hearing Center", "Hearing Institute", "Hearing Bureau", "Hearing Clinic", "Speech and Hearing Centre" or similar representations.

This does not preclude an industry member from representing that he owns, operates, or controls a "Hearing Aid Center", or from using other words or expressions which clearly and without deception identify the member's establishment as a commercial hearing aid enterprise if such be the fact.

14. No industry member shall represent directly or by implication that he is as well or better qualified to diagnose hearing losses as a physician or graduate audiologist, if such is not the fact.

15. No industry member shall represent falsely, directly or indirectly, through the use of any word or term in his corporate or trade name, in his advertising or otherwise that:

(a) he is a manufacturer of hearing aids or devices, or of batteries, parts, or accessories therefor; or

(b) he is the owner or operator of a factory or producing company manufacturing such products; or

(c) he owns or maintains a laboratory devoted to hearing aid research, testing, experimentation, or development; or

to misrepresent in any other material respect the character, extent or type of his business.

16 No installment sales contract respecting hearing aids, devices, parts or accessories shall be falsely represented as a lease or rental plan.

17. No industry member shall advertise or otherwise represent that:

(a) a particular individual, organization, or institution endorses, uses, or recommends such member's hearing aids, devices, or other industry products when such is not the fact; or

(b) a particular individual wears such member's hearing aids or devices when such is not the fact.